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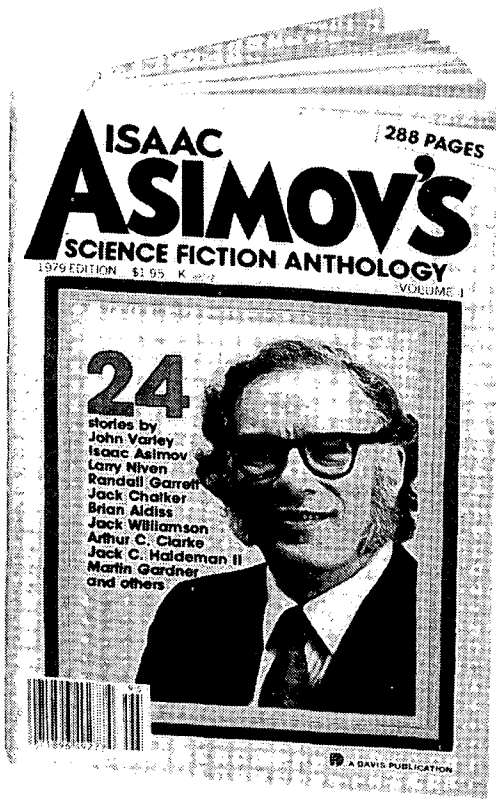

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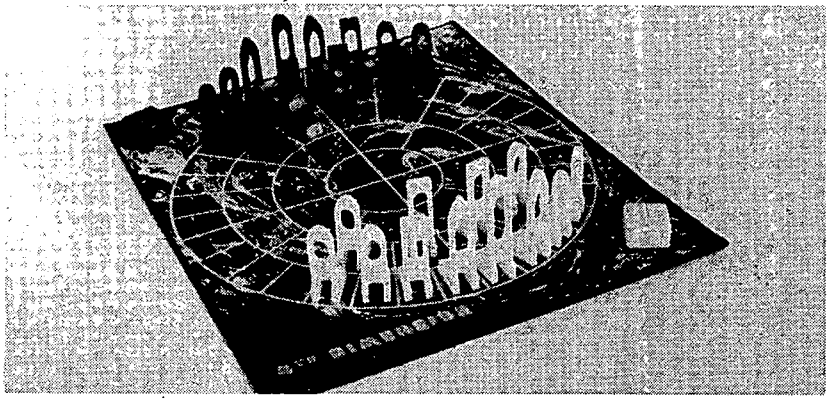

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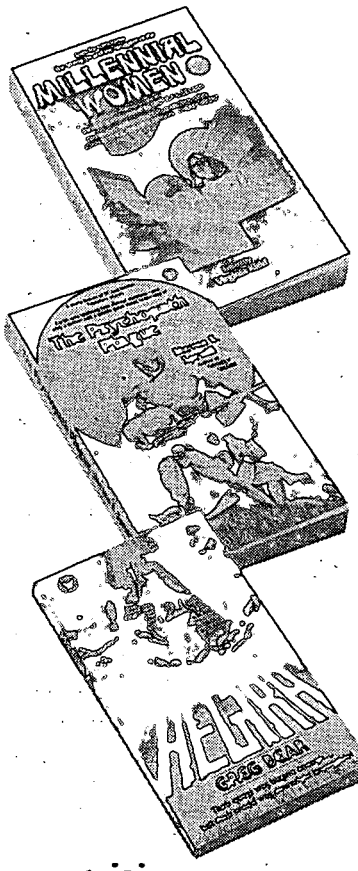

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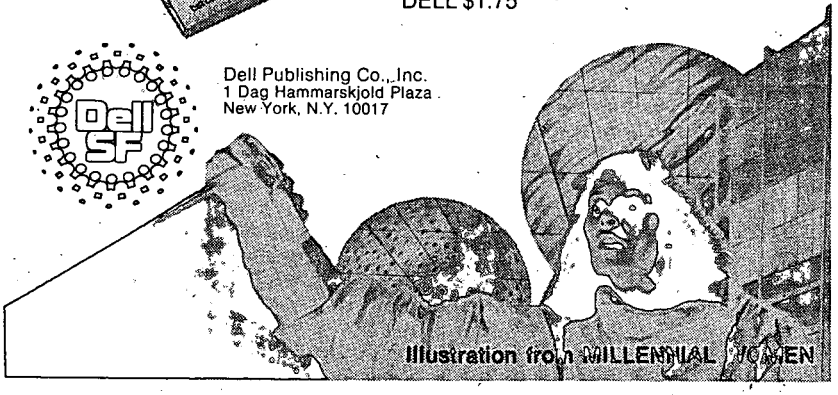

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EDITORIAL: POETRY, FUN, & GAMES

by Isaac Asimov

art: Frank Kelly Freas

Occasionally, you may have noticed, our magazine publishes something that we would casually speak of as "a poem."

But what is a poem? If we're speaking of contemporary poetry then my own personal answer is that I'm darned if I know. It may be that George is more knowledgeable on the characteristics of contemporary poetry than I am; and, if so, let him speak for himself if he wishes, but I myself am distressingly blank on the subject.

I have seen contemporary poems that I have been told are good, and I am willing to accept that. I didn't understand them or perceive their beauty, but I'll accept expert opinions on the subject. After all, there are many mathematical theorems I don't understand or perceive the rationality of; and yet I accept them as true, if I am told by experts that they are. However, I leave higher math to the mathematicians; and I leave contemporary poetry to the poets—rather thankfully, in both cases.

If we look into the past, however, we find an unsophisticated period in which poetry was more understandable than it is today, just as mathematics was. There was a time when poetry was so simple as to be enjoyable, so that simple-minded people like myself yearned for it and applauded it. (In those days, poets sometimes became famous and wealthy, believe it or not.) It is that earlier elementary poetry which I will talk about here.

To begin with, poetry is older than prose, if considered as a literary product. This should be no surprise, for in any non-literate society, tales and legends had to be transmitted from memory. Anything that helps the memory is welcome, and some obvious helps are a strong rhythm and similarities of sound such as alliteration, assonance, or rhyme.

The use of these artificial constraints militates against the ordinary rhythms and vocabulary of speech and often makes it necessary to employ unusual synonyms, word-forms, or syntax. This marks off poetry from prose and lends the former high-flown language and

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elevated tones which lead to other artificialities such as simile and metaphor, complicated allusions, and so on.

Once a society grows literate, poetry is no longer needed as an aid to memory, but by that time it comes to have values of its own. It can do away with rhyme and even with a too-metronomish rhythm, but retain the lofty expression and complexity of phraseology; and if this is well done it is greatly admired. Or else the artificiality of rhythm and rhyme can be accentuated in order to produce a comic effect, and this can be delightful.

It is this latter quality that we occasionally feature in this magazine. The verses we publish are usually short, are recognized forms such as limericks or quatrains, are generally funny or sardonic, and are on themes that have something to do with science fiction. We like such things in reasonable moderation, and we think the readers do, too.

But traditional poetry can be a word-game, too.

Contemporary poetry cannot; and, for all I know, this may be one of its values. Robert Frost, who is a very highly regarded twentieth-century poet, said that writing free verse was like playing tennis without a net. I wouldn't dream of arguing with him.

Traditional poetry has the net, however, and foul lines and complicated rules that everyone understands. After all, you have to stick to particular rhythms and to particular systems of rhyme, and still make sense and have the language flow easily. It's a challenge!

An idea in this connection occurred to me just the other day. I was attending a banquet in honor of Frederick Dannay, who, as "Ellery Queen," is the esteemed editor-in-chief of our cousin-periodical *Ellery Queen's Mystery Magazine*. It was the occasion of the 50th anniversary of the publication of his first book; and one ardent fan produced an acrostic sonnet with the initial letters of the lines, read downward, spelling FREDERICK DANNAY.

There was loud applause; and the gentleman on my left said to me that he had written and read many a sonnet, but had never before come across an acrostic sonnet. Well, I can almost never resist a literary challenge, and in five minutes (maybe ten) I wrote one for him. What I turned out was not great poetry by contemporary standards, or by any standards; it was not even good poetry. However, it was an acrostic sonnet, and here it is:

Some think that he's supreme above us all
In science, and in deep inductive thought.
Rich Earth, he says, is held to our Sun's ball.

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Into Earth's thrall, the changing Moon is brought.
Surrounded, our bright luminary reigns
And lights and warms its nine great circling spheres
As each against the strong attraction strains
Centrifugally through the cosmic years.
Nor can worlds ever dream of breaking loose;
Else would it mean destruction of that law
Which order in the cosmos does produce;
That law that saves us all from chaos raw.
O, that one man should put all matters right
Nor, finding all things dark, deny the light.

In order to play the game, let's understand the rules. A sonnet is a poem of fourteen lines in iambic pentameter; that is, each line is of ten syllables with every second syllable stressed: dih-DAH-dih-DAH-dih-DAH-dih-DAH-dih-DAH.

The rhyme scheme varies. For the Petrarchan sonnet it is: *abbaabba cdcdcd* or *abbaabba cdecde*. For the Shakespearian sonnet it is *abab cdcd efef gg*. For the Spencerian sonnet it is *abab bcbc cdcd ee*.

Given that, here is what I am asking you to do if you wish to accept the challenge.

1) Write a sonnet, fourteen lines of iambic pentameter, with any of the rhyme schemes listed above. The sonnet I myself wrote was a Shakespearian sonnet (in form, if not in quality) because the sonnet read at the banquet had been one.

2) Make it an acrostic. In my sonnet, the initial letters, read downward, spell SIR ISAAC NEWTON, but you can use any name that has fourteen letters. You can use nicknames, middle initials, or titles to get those fourteen letters. (I used "Sir," for instance.) However, you must use a name that is both well-known and that is related to either science or science fiction. For instance, JACK WILLIAMSON, ROBERT HEINLEIN, and ALBERT EINSTEIN each have fourteen letters. You might, alternatively, use *well-known* fictional characters in science fiction or even well-known phrases or words unmistakeably linked to our field. Come to think of it, SCIENCE FICTION itself has fourteen letters.

3) Have the sonnet make clear sense and deal with a subject that is closely connected to the word spelled out by the acrostic. My sonnet, for instance, is clearly concerned with Newton's discovery of the law of gravitation.

Of course, we're not going to involve Shawna or George in this.

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I will print the best one I receive in my editorial space (so that George doesn't have to feel responsible) along with the name of the contestant. Joel, George, and I will each contribute five dollars toward a fifteen dollar prize for that contestant.

Once the sonnet is printed, the game will be over—but I may think of something else eventually.

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ON BOOKS
by Baird Searles

Engine Summer by John Crowley, Doubleday, $7.95.
The Planet Masters by Allen Wold, St. Martin's Press, $8.95.
Legacy by James H. Schmitz, Ace Books, $1.95 (paper).
Harpist in the Wind by Patricia A. McKillip, Atheneum, $8.95.
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John Crowley made a strong impression on many people, including myself, with his first novel, *The Deep,* and augmented it with the second, *Beasts.* Here certainly was a writing talent to watch. Part of that talent is imagery; Crowley draws his characters and settings in ways that stick in the mind—in *Beasts,* a pride of humanized lions prowling an endless plain dominated by a cloud-high building, in *The Deep,* a court masque of Baroque splendor.

Another quality of Crowley's, a subtler one, is a curious kind of gentleness. There were moments of violence in both the novels, but never for its own sake; Crowley avoids the melodrama of action used simply to liven up a narrative. This quality is a dominant one in his latest work, *Engine Summer.*

It takes place in a post-holocaust world, and it's a singularly peaceful one. The end of civilization itself seemed more of a whimper than a bang, and in the many years that have passed, the tiny population has settled down into more or less self-contained communities. Some of the lore of the "angels" (pre-holocaust culture) has been preserved, some distorted, some lost entirely. In the small scale of the novel, we see only two of the communities: Little Belaire, descended from a co-op of the past, and Dr. Boots's List, a community settled in Service City, the remains of an enormous shopping center.

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The story is a gentle one, also, mostly devoted to the growing up of Rush that Speaks, a boy of Little Belaire, his search for a saint-hood similar to those of the very immediate saints who helped found and preserve Little Belaire, and his search for Once a Day, a girl who had gone off with a trading party from Dr. Boots's List.

The delight of *Engine Summer* comes from the wonderfully intricate cultures Crowley has created. Their folklore and folkways, use and misuse of the artifacts of the angels, their very patterns of living are ingenious, ingenuous, often amusing, and always convincing.

I must admit to a certain impatience toward the end of the novel; there is a literal *deus ex machina* in the form of a parachutist from an extant flying city of the angels, and a confusing climax involving just who Dr. Boots really was that gets a bit muddled between physics and metaphysics. But the visits to Little Belaire and Service City were worth it.

The "first novel" is a traditional problem for book reviewers. One wants to be a little kinder than usual, so as to not frighten the fleeting manifestation of ability, and so far as I'm concerned, the mere act of *finishing* a novel shows the primary talent needed, which is dogged persistence.

But some first novels are better than others, and Allen Wold's *The Planet Masters* is not one of those. In it, an engaging rogue, Larson McCade, has come to Seltique, a planet cut off from the mainstream of Galactic culture for many hundreds of years. He is after an ancient artifact, a "book" that he thinks will bring him untold wealth and power, and the story is of the intrigue and adventure of his search for this object. Unfortunately, he's not very interesting; the quest is not very interesting; Seltique as a culture is pretty dull (it is constantly referred to as "decadent," but it's the most antiseptic decadence I've ever run into; even the habit of legalized murder to acquire status is hardly decadent; rather, it resembles the genetic elimination of weaklings in Heinlein's overdressed, trigger-happy culture of *Beyond This Horizon*); and the one attempt the author makes at an imaginative touch is an alien, intelligent, talking bird given to remarks like "A little man told me."

Maybe Mr. Wold should have done a bit more reading in past action-adventure SF with an icing of intrigue. James H. Schmitz is dandy at this sort of thing; an excellent example is his *Legacy*. First published in 1962 as *A Tale of Two Clocks* (as much as I disapprove

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of retitling books, as Ace is prone to do, the new title is the better one), it has been unavailable for a very long time.

Legacy follows a typical Schmitz pattern in starting off deceptively mildly in very small-scaled circumstances and galumphing along at breakneck pace until you've got a situation that affects all of the planets of the Galaxy. In this case, we meet Trigger Argee, who is involved in a project to study plasmoids, strange Old Galactic artificial entities whose use and functioning is unknown. Trigger, needless to say, is one of those Schmitz heroines: gorgeous and very able to take care of herself.

Before you can say "Old Galactic plasmoid," skullduggery is afoot. It seems that every power group in the Galaxy wants the mysterious beasties, and in the multi-cornered struggle, there are kidnappings, counter-kidnappings, intrigue on a luxury interstellar liner, shoot-'em-ups, shoot-'em-downs, and a madly circuitous, but thoroughly enjoyable route to the dual resolutions of what the plasmoids are and why all those people want them.

Aficionados of epic fantasy, until recently, had to be content with a very few works in that area, but lately they seem to be coming from every direction. Most are all too influenced by Tolkien, and in a few cases, "influenced" is an extremely kind euphemism. But one trilogy-to-be has stirred every fantasy lover I know (including me) to incoherent ecstasy, and that is the one by Patricia McKillip that began with *The Riddle-Master of Hed.* The trilogy-to-be is now, thank goodness, a trilogy-that-is (it's been a long wait since that first volume); the third book is called *Harpist in the Wind.* (Number two is *Heir of Sea and Fire.*)

The trilogy, like *The Lord of the Rings,* is a continuing narrative. That is the only overt resemblance between the two, except for excellence and wonder. All of the characters of the Riddle-Master books (please God, don't let them come to be called the Hed Trilogy) are human, though of a vast variety (shape-changers, ghosts, sorcerer-kings). It is certainly the least epic of epic fantasies; maybe a new term should be invented, since the world of the Riddle-Master is quite small and we cover it from one end to the other across its handful of countries several times during the story.

Despite this, the world and the narrative are very complex, and McKillip makes few explanatory condescensions. The style is also curiously modern, at times downright funny (not every fantasy has a pig stampede). In particular, Raederle, the heroine who dominates book two, has a sharp and witty tongue ("Having a father flying

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around in the shape of a crow gives you a certain disregard for appearances.")

I won't say more about the Riddle-Master books because their texture is all riddles, mysteries, and surprises. But they are very simply the best of their kind since *The Lord of the Rings*.

Slowly but surely all the "lost" works of science fiction are being reprinted, those books of ten, fifteen, twenty-five years ago or more that enough people have remembered to have created a certain legendary status for them. (Not to mention astronomical prices for a copy when it turns up.) One such is Wilmar Shiras's *Children of the Atom,* which was originally a series of short stories in *Astounding* in the late 1940s and then was published as a whole in hardcover and paperback, both in very small printings.

Nevertheless, it stuck in people's minds, and it became one of those wanted books. Now it is back in print, and rereading it after all these years gave me mixed reactions.

The story of the human mutation of superior ability struggling with human society in the contemporary or near-future world is a small but major subgenre of SF. One of the reasons for the paucity of this kind of story was that it meant dealing in terms of character and emotion almost entirely, which was not one of the strong points of SF until fairly recently. Another may well have been that one of the earliest works of this kind was of such towering quality that it was a very hard act to follow. It is impossible to talk about the "mutant superman" story without bringing up Olaf Stapledon's *Odd John*.

Children of the Atom suffers by comparison, as do most of the others. In it, a child psychologist discovers a 13-year-old boy of staggering intelligence who is doing a brilliant job of hiding that intelligence, of seeming average in every way. The boy Tim is apparently the product of an accident at an experimental nuclear plant in which both his parents were involved, and from which they both eventually died. Other children had been born to those affected by the same accident, and the narrative is devoted to the finding of these (who all turn out to be superbright), their gathering together in a special school, their adjustments to each other, and the eventual decision as to what they will do with their lives.

It's all pretty bland. The "wonder children," as Shiras has her psychologist dub them, are nice kids with only minor maladjustments, all neatly solved. In fact, everyone is very nice with the exception of a religious fanatic who manages to work up a xeno-

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phobic mob for an hour's uneventful confrontation.

Part of the problem here is that *Children of the Atom* has dated badly, in a way that SF usually doesn't. It reflects all the attitudes of America of the '40s: intelligence and academic skill is *the* important thing, run a close second by superficial adjustment to a superficial culture; the arts are rendered lip service, but are handled with painful naïveté except for writing; sex and sexual mores are hardly mentioned. There is barely a hint of the esthetic, emotional, and intellectual complexity of Odd John and his brethren by which Stapledon so thoroughly convinces you that they are indeed another species, and a frightening one. In all fairness, it should be said that Shiras makes it clear that her children are superior *only* in intellect.

And there might be the secret of the book's continuing popularity. I would guess that a majority of science fiction readers have been over-intelligent, socially maladjusted youngsters; empathy with the children of the atom is inevitable.

Speaking of the arts and science fiction, one of the few genre novels to take an art form as a spin-off point is back in print, Jack Vance's *Space Opera*. The art is that of opera (surprise!), and it might be guessed that Vance decided to do a novelistic pun on the good old term "space opera," which for you newcomers refers to classic action-adventure interplanetary or interstellar SF.

The novel *Space Opera* is a light and fairly mindless chronicle of the adventures of an opera company doing a tour of a number of planets in a far-future galaxy of innumerable sentient races, most of which have absolutely nothing in common with the others. There are all sorts of cultural complications and misunderstandings. The byzantaurs of Sirius system live in caves, from which expulsion is the ultimate disgrace; the presentation of *Fidelio,* which takes place in a prison and is all about *freedom,* not only confuses them, but rouses them to violence. The Striads of Zade think that *The Magic Flute* is a sort of commercial trade show, and place an order for two oboists and a coloratura. To the Mental Warriors of the same planet performances are tests of valor; *The Bartered Bride* is pretty tame stuff, and they subject the company to an exchange performance in which the audience is treated to flame throwers, falling boulders, and razor-edged pendulums.

It's a one-joke book, which luckily doesn't go on long enough to wear thin. My major complaint is that Vance doesn't take enough advantage of the intrinsic humor of opera itself, certainly one of the funniest of the fine arts.

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About three years ago, science fiction publishing began to get into the pernicious coffee-table book, large, brightly colored objects which you want to own, but having paid the usually steep price, look at once and then leave about—where else?—on the coffee table. There are exceptions; *Great Space Battles* is one such. It is a straightfaced account of Terran expansion to the stars, the years-long Laguna Wars, and various less-major conflicts, and is billed as a Terran Trade Authority Handbook. Its authors, Stewart Cowley and Charles Herridge, are respectively the historical advisor to the Galactic Technology Museum at Miami Spaceport and the Mars War Museum, and Secretary to the Terran Defense Authority War Group (phew). It's all very nicely done indeed. Almost every other page is a handsome colored illustration (of a great space battle, of course), and there are now *paperbacks* that cost more than this hardcover volume, for heaven's sake. It's a real bargain, as was its predecessor, another Terran Trade Authority Handbook called *Spacecraft 2000 to 2100 A.D.*

Technical point . . . I wish somebody would invent a handy term for non-fictional science fiction—or science fictional non-fiction—such as the above TTA Handbooks.

And a correction . . . two months ago in the rush to get my first column done, I misquoted the price on another good-looking book from the same publisher, Chartwell Books. *The Trigan Empire* is $6.95, which makes it yet another excellent buy.

And in the area of art books plain and simple, one devoted to *The Art of the Brothers Hildebrandt* is now with us. Their work as cover artists and illustrators is vastly popular; there are several of my favorite covers here, such as the ones for *The Best of C.L. Moore* and *Earth's Last Citadel.* I do find their depictions of people problematical, having the quality of rather high-class waxworks.

And finally, the first two volumes of a projected complete collection of the fiction of Isaac Asimov in hard cover have been published. Volume 1, under the title of *The Far Ends of Time and Earth,* contains *Pebble in the Sky, The End of Eternity,* and *Earth is Room Enough.* Volume 2, *Prisoners of the Stars,* contains *The Stars Like Dust, The Currents of Space,* and *The Martian Way.*

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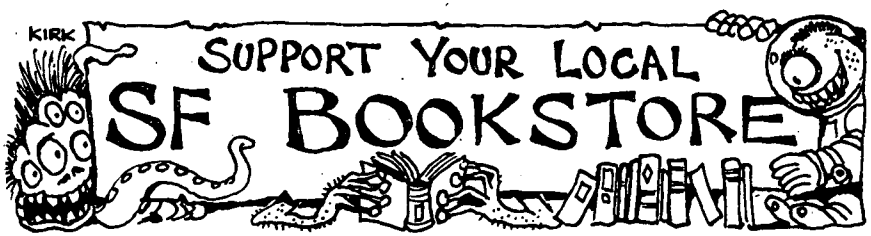

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THE SF CONVENTIONAL CALENDAR
by Erwin S. Strauss

Now that school's out, there's time to share your interest in SF. Get out to a con(vention) soon. When writing, enclose a self-addressed, stamped envelope (SASE). If you can't reach a con, call me at (301) 794-7718. If my machine answers, I'll call back. For a later, longer list of cons—and a sample of SF folksongs—send me a SASE at: 10015 Greenbelt Road #101, Seabrook MD 20801. If you're planning a con, let me know. There's no charge for listings. When phoning cons, don't forget to state your name and reason for calling. Look for me at cons in my con persona "Filthy Pierre."

OhioRivaKon. For info, write: **Box 832, Jamestown NC 27282.** Or phone: **(305) 275-5957** (10 am to 10 pm only, not collect). Con will be held in: Louisville KY (if city and/or state omitted, same as in address) on: 6-7 July, 1979. Guests will include: none announced. Not connected with previous Louisville cons, whose people are busy with NorthAmeriCon.

WesterCon, Sheraton Palace Hotel, San Francisco CA, 4-8 July. R. Lupoff & B. Pelz. The big Western con. Join at the door. The masquerade usually brings out spectacular costumes.

X-Con, (414) 282-5489. Milwaukee WI, 6-8 July. Kelly and Polly Freas and Doug Price.

Darkover Council, (516) 781-6795. LaGuardia Sheraton NYC, 13-15 July. Marion Z. Bradley.

Archon, (314) 428-7939. St. Louis MO, 13-15 July. Joe (The Forever War) Haldeman.

UniCon, Box 263, College Park MD 20740. (301) 794-7374. Washington DC, 20-22 July. Note the change of dates. Washington's summer con moves downtown, to the Shoreham Hotel.

DeepSouthCon, 1903 Dante, New Orleans LA 70118. (504) 861-2602. 20-22 July. R. A. Lafferty. This is the annual traveling Southern con, complete with 24-hour party room.

Conebulus, c/o Carol Gobeyn, 619 Stolp Ave., Syracuse NY 13207. (315) 471-7003. 20-22 July.

OKon, Box 4229, Tulsa OK 74104. (918) 747-3621. 21-22 July. Jack Williamson & Bob Aspirin.

Space:1999 Con, 123 Fawn Valley Dr., McMurray PA 15317. Pittsburgh PA, 27-29 July. Gerry Anderson and Barry Gray. The official convention for fans of the television series.

August Party, Box 924, College Park MD 20704. (301) 277-1354. Washington DC, 3-5 Aug. The last of this annual series of Star Trek cons. Trey're only about ⅓ Star Trek, though.

SeaCon, Box 428, Latham NY 12110. (518) 783-7673. Brighton (near London) England. 23-27. Aug. The World SF Convention for 1979. Book now, before the hotels & cheap flights fill.

NorthAmeriCon, Box 58009, Louisville KY 40258. (502) 636-5340. 30 Aug.-3 Sept. Frederik Pohl, Lester Del Rey and our own George Scithers. The continental con, while the WorldCon is abroad. Everything the WorldCon has but the Hugos—plus a moonlight river cruise.

RoVaCon, Box 774, Christianburg VA 24073. (703) 389-9400. Roanoke VA, 28-30 Sept.

MosCon, Box 9141, Moscow ID 83843. (208) 882-8781. 28-30 Sept. Robert Heinlein (health permitting) and Alex Schomburg. A rare con in the Empty Quarter of the continent.

SciCon, Box 6259, Newport News VA 23606. Hampton VA, 13-14 Oct. Joe Haldeman, Kelly Freas.

MileHiCon, Box 11545, Denver CO 80211. (303) 433-9774. 26-28 Oct. Jack Williamson.

MapleCon, Box 2912 Stn. D, Ottawa, Ont., Canada K1P 5W9. (613) 836-1218. 26-28 Oct., 1979.

NorEasCon II, Box 46, MIT PO, Boston MA 02139. 29 Aug.-1 Sept., 1980. Damon Knight, Kate Wilhelm and Bruce Pelz. The World SF Convention for 1980. Save $10—join in June for $20.

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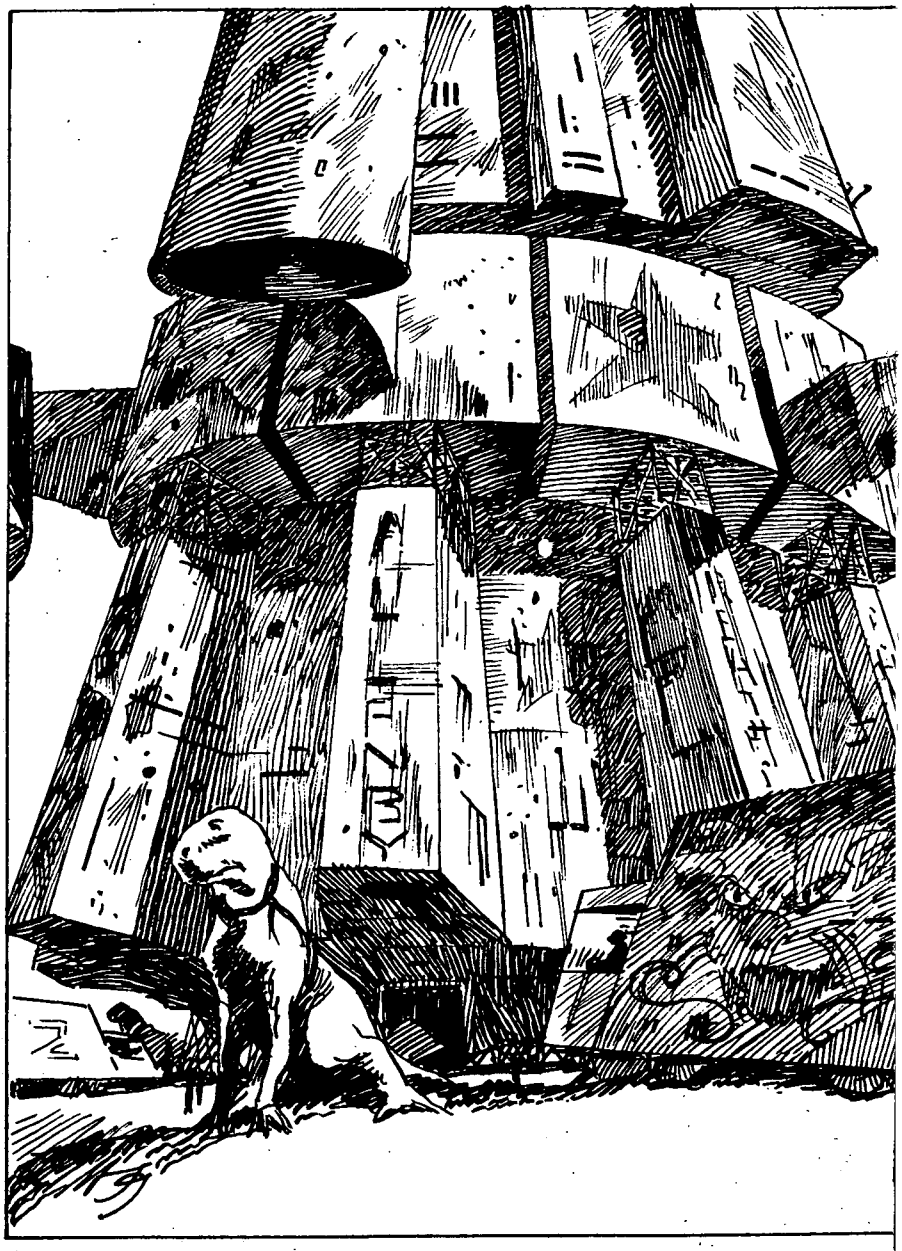

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PRIEST OF THE BARABOO

by Barry B. Longyear

art: Jack Gaughan

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ARNHEIM & BOON'S CIRCUS

For Over 3 (Standard) Centuries

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The Greatest
116 Multi-Species Acts In The Universe

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DO NOT BE CONFUSED! Arnheim & Boon's Circus is the first and oldest Show of Shows, not to be confused with the poor imitation from Momus, Allenby's Greater Shows, which has never seen an off-Momus performance . . . . .

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"Bah!" Bunsome crumpled up the rat sheet distributed by the quick agents of the competing circus, dropped it on the dusty soil of the planet Pyroel and kicked it into the road where it was soon flattened by the heavy, canvas-laden sledges pulled by the lizards. The great reptiles of Momus, their lovely green scales hidden under layers of grey dust, puffed and strained against hand-made harnesses, while handlers and roustabouts pushed the sledges or pulled with the lizards. A handler pointed toward his lizard's destination; and the lizard stopped and muttered an obscenity at the handler, who shouted more obscenities back at the huge beast.

The scene reflected too well his own mood, and Bunsome turned his back, pulled up his robe which was stitched with the black-and-white diamonds of the priests, and sat crosslegged on a crate. A few squat Pyroelian nestlings, bored with watching the lizard and the human argue, waddled off to where other humans and lizards pushed and pulled the huge timbers that would support the big top. Bunsome shook his head, then let it drop into his palms, his elbows resting on his knees. As the junior Moman priest on the *City Of Baraboo II,* he had been assigned to collect information on the competing circus, and that he had done.

While Allenby's Greater Shows used lizard power and human muscle to move canvas, timbers, and heavy equipment, Arnheim & Boon was fully mechanized with quiet, powerful tractors and cranes to use against the heavy Pyroelian gravity. Instead of hectares of painfully hand-woven, hand-stitched canvas, Arnheim & Boon sported a huge, light, fabric dome inflated by compressed air that, because it was clear as glass, needed little additional lighting at night and none in the daytime. While Allenby's lizards and humans vented their frustrations on each other, Arnheim & Boon's company had finished setting up and was preparing for its great free parade through Cukyu, Pyroel's principal population center.

There is more, thought Bunsome, always more. Even though the *Baraboo* had spun to provide increased gravity for the entire three week trip from Momus to allow the performers to adjust their acts, few of them seemed confident about working in this heavier gravity. The Arnheim & Boon unit on Pyroel, only one of twenty-four such companies, did nothing but play the high-gee planets and even had a number of Pyroelians in its acts. The Momans had picked Pyroel because it was the closest planet to Momus that could be booked, and Allenby's Greater Shows couldn't afford to fuel the *Baraboo* any further. Who could have

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known that Arnheim & Boon would be there?

"Hey you!"

Bunsome turned toward the voice and saw a figure standing in the hatch of the *Baraboo*'s decrepit cargo van.

"You waiting to go back to the ship?"

Bunsome nodded. "Yes."

The figure waved. "Let's go, then. We're empty as Allenby's purse."

The priest climbed down from the crate and shuffled through the dust, recalling the five brightly painted shuttles that put Arnheim & Boon's Circus on the surface. With no shuttles in working condition, the *Baraboo* itself had put down outside of Cukyu, using up the remainder of its fuel in the landing. The artwork on the ship had burned off in the atmosphere, leaving the *Baraboo* black and mottled. As he stepped up and entered the hatch of the van, Bunsome bumped into a Montagne wearing roustabout's black-and-tan robes.

"Why don't you watch where you're going?"

Bunsome reached into his purse and dropped five copper beads into the roustabout's hand. "My apologies."

The roustabout pocketed the coppers and pointed with his thumb at the seats along the side bulkhead, then returned to his task of securing the van's cargo straps. When he finished, he moved to the front and joined the Arvanian driver.

Bunsome strapped himself into the unpadded seat and wished he was back on Momus. If the original *City Of Baraboo* hadn't stranded its company on Momus two centuries ago, thought Bunsome, bless my coppers if we wouldn't show Arnheim & Boon a show. But the necessities of survival on an uninhabited planet and two centuries without an audience had taken a toll.

The van lurched, banging Bunsome's head against the bulkhead. As the cargo compartment filled with fine, choking dust, the priest glared at the earless Arvanian driver, prepared to demand coppers for the poor ride. Bunsome saw the Montagne staring indifferently through a side port, seemingly unbothered by the dust, noise, and bouncing. The priest shrugged and turned his growing hostility on his own occupation.

"Priests," he muttered. "What good are we, except to collect our facts and write our little histories?" Bunsome recalled the Dovinite missionary he had met on Pyroel. "Now, *that* was a priest!" He remembered the clean lines of the altar and the gleaming gold and purple of the windows. But, most of all, the Dovinites had

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gods to worship, gods that would do things for them if they asked properly. But the gods would not hire out to a circus; Bunsome had asked the missionary. It seemed that the Dovinites had an exclusive contract, and the contract was not up for sale. Whether it was a case of too little or too much business sense on the part of the Dovinites, Bunsome wasn't sure. He dozed, wishing he had followed his original hunch years before to apprentice as a mason or carpenter. Priesting was an easy life; and he liked the books; but there was no money in it, nothing else of importance either.

The priest came fully awake as the van lurched to a halt. He turned and looked through the dust-covered side port behind his head. The ugly, patched hulk of the *Baraboo,* its vanes and fins sagging against the gravity, looked back. Bunsome snorted. Threads of his dream, of the Dovinite minister's service, still ran through his mind—the congregation uplifted by the Dovinite's story and by the promises the Dovinite had made. Bunsome sighed, turned from the port, and released his straps.

As he stepped down from the hatch and walked around the van, Bunsome saw the next load of lizard-drawn equipment waiting to pile on the vehicle. Against the open door of the *Baraboo*'s cargo bay stood Nusset, the apprentice to the ship's senior priest, Shelem. Nusset picked his teeth with a fingernail and watched Bunsome approach through half-closed eyes. The apprentice priest wagged a finger at Bunsome. "You'd best get cleaned up. Shelem wants to see you."

Bunsome reached into his purse. "What about, Nusset?" The apprentice shrugged and turned into the ship's bay door, leaving Bunsome with his coppers.

Nusset looked over his shoulder. "Will you recite your notes for me to copy right away?"

"No. I shall have to see what Shelem wants of me first."

"I'll be at level six, then, watching the flyers practice, if they'll let me."

Bunsome nodded. "I'll be in the scriptorium."

Nusset laughed. "Where else?" The apprentice turned off the main corridor, leaving Bunsome to himself.

Bunsome walked quickly, his nose wrinkling at the lizard stench. *If we do manage to get some customers into the big top, despite Arnheim & Boon, the smell will probably drive them out again!* He shrugged, remembering it was mostly the closeness of the ship. On Pyroel's surface, the lizards would be able to wash

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themselves. *A chip of consolation,* Bunsome snorted to himself, *floating in a sea of disaster.*

As his path took him deeper into the bowels of the *Baraboo,* others passed him in the corridor or stood in small groups—clowns, freaks, magicians, roustabouts—either arguing or talking sadly in low voices. Even the usually emotionless Arvanians in the company were shouting and fist-shaking. Bunsome shook his head, sighed, and turned right into a narrow corridor.

As he approached the door of the scriptorium, at the end of the dimly lit, deserted corridor, Bunsome hesitated as he recognized Allenby, decked out in gold cape and black slouch hat, pacing in front of the door. Allenby looked up at the sound of Bunsome's footsteps.

"Ah! I hoped you would be back soon."

Bunsome halted in front of Allenby and nodded. "What may I do for the Great Allenby?" He held out his hand and Allenby dropped several copper movills into it.

"Arnheim & Boon: are they ready for their parade?"

"Yes." Bunsome couldn't meet Allenby's eyes. "They will march before the sun sets."

"What do they have for great beasts, Bunsome?"

The priest pulled at his lip, then dropped his hand. "Nine acts, Great Allenby, from as many planets—"

"Do they have elephants?"

Bunsome nodded. "Twenty. They're magnificent animals. Before, I had only seen pictures—"

"Yes, yes." Allenby waved his hand for silence, his pale blue eyes staring into an ocean of poor options for the unknown thing that would save the *Baraboo*'s bacon.

"Great Allenby, at least we have the lizards. Arnheim & Boon has nothing like our lizards," Bunsome tried to encourage.

"Humph!" Allenby shook his head. "Stoop, the head lizard, only this morning demanded more pay for the reptiles." Allenby waved his hand, then dropped it. "Because of the gravity. I thought we could beat the gravity; I must be seven kinds of a fool! At least you don't have to pay elephants." Allenby looked into Bunsome's eyes. "What of their clowns, magicians?"

"I saw none of their acts, but surely ours are the best, Great Allenby."

Allenby shook his head. "Perhaps. I would feel better had we not left our best on Momus."

"They are too old, Great Allenby; too old to make the trip."

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"Shelem made the voyage."

Bunsome shrugged and held out his hands. "A priest doesn't have to perform; and besides, Shelem hasn't been feeling well."

Allenby frowned. "Is it anything serious?"

Bunsome dropped his hands to his sides. "I'm no physician, but it's probably nothing more than age."

"Age." Allenby repeated, then looked at the corridor deck. "I understand age to be a terminal affliction." Bunsome shrugged and nodded. "I wish him well, Bunsome. I may need his services before long." Allenby nodded, then walked around Bunsome, heading with deliberate steps toward the main corridor. Bunsome turned to the scriptorium door and opened it, exposing the manuscript-piled interior. The built-in metal desk, Shelem's customary working place, was unoccupied.

Bunsome entered and closed the door, grateful that the smells of ink, leather, and aged paper drowned the unwashed-lizard smell that seeped throughout the ship. The compartment was empty; and Bunsome poked around, waiting for Shelem. At the large copy table in the center of the room, he noticed that Nusset had fallen behind copying Shelem's latest manuscript, which would never do. Many priests back on Momus would want copies—Bunsome laughed to himself. *If we ever get back to Momus. The last of our fuel was used to put the company planetside without enough to spare to relocate elsewhere on Pyroel, away from Arnheim & Boon.* Allenby's had been at it two days, setting up, with the raising of the big top still to be done. Seeing the weak competition, Arnheim & Boon put down their show in the same city eight hours before, and they were ready to parade.

Bunsome turned his eyes toward the volume-crammed shelves and ran his fingers along the glossy leather bindings until he came to *One: The Book Of Baraboo.* Half the book was filled with tales and reminiscences of ancient Earth, before the circus began to cross the void, but the second half told of the voyages of the *City Of Baraboo* and O'Hara's Greatest Shows, the finest collection of artists and games in the entire Ninth Quadrant. *The old company,* thought Bunsome, *now, that would have been something to see.* The old *Baraboo* would begin its parade four hours after achieving orbit, with combination-function ship's compartments detaching to act as their own shuttles.

Bunsome shook his head, thinking of the salvaged Arvanian battle cruiser that served as the *Baraboo II.* Only two of its original twenty combat landing-shuttles remained, and both of those

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were broken down on Pyroel with no hope of repair without money for parts. He let his fingers slide down the binding, then drop to his side.

"SCRIPTORIUM."

"Aaaahhh!" Bunsome clamped a hand over his racing heart, and quickly looked around the compartment, relaxing only when he saw the intercom set in the bulkhead above Shelem's desk. *I never will get used to that.*

"SCRIPTORIUM, THIS IS THE SICK BAY."

Bunsome went to the desk and touched the call button. "Yes?"

"BUNSOME?"

"Yes."

"THIS IS DOCTOR VOR. CAN YOU COME DOWN TO THE SICK BAY?"

Bunsome disliked the Arvanian physician. He disliked all Arvanians as a rule, but disliked Vor in particular. "What's the problem, Vor? I'm very busy."

"SHELEM IS DEAD. I HAVE ALREADY NOTIFIED ALLENBY. SHELEM LEFT A MESSAGE FOR YOU."

Bunsome lowered himself to Shelem's chair. "I'll be down . . . I'll be down as soon as I can."

"PLEASE ACCEPT MY CONDOLENCES."

Bunsome was nodding as the intercom clicked off.

Returning from the sick bay, Bunsome stopped at the wardroom as he had been instructed by the barker sent by Allenby. As he entered, Bunsome saw Allenby seated behind a large bowl of sapwine, rubbing his eyes. Allenby looked up and dropped some coppers on the table. "Here, Bunsome. We haven't much time." Allenby pointed to a couch to his left at the table. Bunsome pocketed the coppers and sat. "Are you well, Bunsome? You look terrible."

Bunsome nodded. "It's only this on top of everything else. . . ." He weakly waved a hand, then dropped it in his lap.

Allenby sighed, and both sat for a moment in silence. "Bunsome, I need your help."

"Of course; whatever I can do, Great Allenby."

Allenby nodded, his jaw set, his eyes unblinking. "I don't suppose it's any secret that the show is in trouble."

"Someone in the universe might not know, although I doubt it, Great Allenby."

Allenby drank from his bowl, then placed it on the table. He pointed at the bowl. "Care for some?"

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"Please."

Allenby reached behind his couch to a shelf and picked up a bowl and a fresh jug of sapwine. As he poured, he continued. "The only secret left, Bunsome, is just how much trouble we're really in." He plugged the jug and pushed Bunsome the bowl. The priest dropped some coppers on the table and picked up the bowl. "Before we left Momus, even before we formed the company, the fortune tellers saw this coming. If something cannot be done, I doubt that we will even be able to open; or, if we do open, it will be a complete farce."

"What is it?"

Allenby leaned forward and rubbed beneath his nose with the thumb-side of his hand. "The performers; they are afraid to go on—"

Bunsome let out an involuntary burst of laughter. "My apologies, Great Allenby," he tossed two movills on the table. "Please excuse me, but nothing could be harder for me to imagine. They are all master performers, with many years in ring and midway behind them. Afraid?"

"It's true, all the same. How many practices have you seen?"

Bunsome sipped from his bowl, then shrugged. "Quite a few soon after we left Momus, but none for more than a week. Even the clowns stopped letting spectators watch, even if they paid."

"You see? Does your imagination stretch to the point of that? Clowns refusing to perform for coppers?"

Bunsome nodded. "I see what you mean. It happened so gradually, I never suspected . . . but why? They are no less the performers they were on Momus."

Allenby rubbed his chin, then leaned back on his couch, bowl in hand. "This ship, Pyroel; both are strange grounds. The Pyroelians are a strange audience, and now, with Arnheim & Boon as competition . . . Doctor Vor treated Rulyum the juggler today for a broken toe. Rulyum dropped his clubs during a practice."

"Rulyum!?" Bunsome's mouth hung open. "Not Rulyum!"

"Are you beginning to understand now?"

"Yes." Bunsome shook his head. "Yes and no. Why are we plagued in this manner? Can't something go right for us?"

"We knew we were taking a big chance putting the show on the road so soon, but we had to go when we could get the coppers. If we had waited any longer, the backers would have begun withdrawing their funds." Allenby shrugged. "It was go when we did, or not go at all."

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Bunsome recalled his feelings after observing the Arnheim & Boon preparations. "That may have been the better choice—not going at all."

"It is academic; we are here, and here we stay unless we can put on enough of a show to meet our expenses." Allenby put his elbows on the table and clasped his hands. "I am convinced that this company can draw a paying crowd; what we lack in numbers and glitter we more than make up in skill and polish. I have our parade scheduled for the sixth post-meridian hour this day—a full hour before Arnheim & Boon takes to the road."

"The big top isn't even up."

"Nevertheless. Right now every spare pair of hands and every reptile, including Stoop, is out there getting ready. I think the equipment will be ready on time, but this will do us little good unless the company hits the streets of Cukyu, not as a shambling, dispirited mob, but as a *circus*."

"Great Allenby, you asked me if I would help." Bunsome raised his eyebrows and shrugged. "But what can I do? I am only a priest—a mere historian."

"Shelem worked with the fortune tellers before we left Momus. He had an answer."

"What was it?"

Allenby shook his head. "I was hoping he had told you."

"No."

"He discussed nothing about it with you?"

Bunsome shrugged. "He discussed nothing about anything with me starting from when we left Momus. He spent all his time buried in his manuscripts, writing . . ." The priest reached into his robe and withdrew the slip of paper Doctor Vor had given him.

"What's that?"

"Vor copied it. He said it was Shelem's message to me." Bunsome unfolded the paper, then let loose a disappointed sigh. "It's nothing."

"What does it say?"

" 'Forty-seven: thirty-four. Read this.' "

"That's all? What do the numbers mean?"

"You must understand, Great Allenby, Shelem was very old, and his mind . . . well, this is a perfect example. It's obviously a book and chapter index number, but Shelem's histories for the Tarzak priests begin with book forty-one and end with forty-six. There is no book forty-seven."

"Bunsome, perhaps that was what he was writing."

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"No doubt, but no priest could perform in recital material that has not been approved by the rest of the Tarzak priesthood. Perhaps they do things that way in Ikona, but . . ."

"What period does that chapter cover?"

"I don't know. Young Nusset—Shelem's apprentice—would know. He's been copying the manuscript."

Allenby pressed a panel in the table top and called the scriptorium. Nusset answered. "This is Allenby, Nusset."

"YES, GREAT ALLENBY?"

"In Shelem's new book, what period is covered by chapter thirty-four?"

" . . . ER, I'M NOT SURE. ONE MOMENT."

Allenby raised his eyebrows at Bunsome who only shrugged. "Apprentices aren't what they used to be."

"GREAT ALLENBY?"

"Yes, Nusset?"

"I HAVE IT. NOW, THIRTY FOUR . . . HMMM. THAT CHAPTER COVERS THE WAR. IT SEEMS TO BE COMPLETE."

"Nusset, bring it to the wardroom." Allenby looked up to see Bunsome frowning. "What is it?"

The priest shook his head. "Shelem would have me read *that* to the ship's company? The blackest period in the history of Momus? If the company's frame of mind is as uncertain as you describe it, Great Allenby, that chapter should easily put them over the edge."

"Perhaps."

"Perhaps? I do know something of priesting."

Allenby nodded. "I meant no offense, Bunsome, but Shelem's office as senior priest of the *Baraboo* leads me to believe that he, too, knew something of his trade."

Bunsome blushed. "Of course. But where is the inspiration for this company in death, defeat, and despair? Wouldn't a few passages from the older works—perhaps the voyages of the original *Baraboo*—wouldn't something such as that be better?"

"Perhaps." They waited a few moments in silence, then turned toward the wardroom door as Nusset entered holding a sheaf of papers. Allenby took them and handed the apprentice several coppers. Before Nusset had left the room, Allenby was reading the papers, motionless save for his darting blue eyes. As he reached the end of a page, he would place it in back of the remaining sheets. Bunsome thought again of the Dovinite missionary as he watched Allenby giggle, then frown, then sniff back a tear as he

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nodded, turning to the next page. *I'm not too old,* thought Bunsome. *I could apprentice again as a mason. There are many similarities between priesting and newstelling—storytelling, too. If I ever get back to Momus.* He sighed and looked up to see Allenby, a strange look on his face, holding out the papers. After Bunsome took the chapter, Allenby stood and walked to the door, then stopped.

"Bunsome, you will address the company with that chapter at the fourth hour. Be ready." He turned and left.

The priest sat staring at the empty door for a few moments, then looked at the papers in his hand. Shelem's familiar scrawl covered the unlined sheets. Shaking his head, Bunsome began reading."

At the fourth hour, Bunsome stood on a packing crate in the *Baraboo*'s cargo hold with the assembled ship's company surrounding him. Humans, Arvanians, and lizards—all in parade costume—stood silently, waiting for the priest to begin. Bunsome cleared his throat and began:

It was the two hundred and fourth year of the Baraboo *disaster, and the fifth year of Lord Allenby's office as Great Statesman of Momus. The protection of the Ninth Quadrant Federation of Habitable Planets, which Allenby once represented as ambassador, had been withdrawn under orders of the Ninth Quadrant's Council of Seven to strengthen the defenses near the center of population which had come under the scrutiny of the Tenth Quadrant's warlords. All that remained were a scattering of Montagne soldiers who had taken retirements or discharges on Momus, and the assurances of the United Quadrants that it would come to Momus's defense in the event the planet suffered an invasion.*

As Bunsome read Shelem's words, the months of struggle, pain, and suffering melted until both priest and performers were carried back to that dark hour.

At the same time the last Ninth Quadrant ship abandoned the skies of Momus, Lord Allenby invited the great masters of the planet to meet. They gathered in Allenby's quarters in the town of Tarzak and met with representatives of the Montagne soldiers who had been left behind. . . .

Lord Allenby, seated crosslegged behind his table, let his eyes drift over the gloomy faces in his quarters. "Any suggestions?" He

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stopped on the face of a young man dressed in roustabout's black-and-tan. "Painter? You're the senior Montagne left on the planet."

Standing behind those seated around Allenby's table, his back against the wall, the former infantry lieutenant shrugged. "If the intelligence projections General Kahn supplied you are accurate, the Tenth Quadrant will pile in mercenaries—Arvans probably—under some pretext that will give the United Quadrants a loophole through which the UQ can refuse intervention. *When* is the question, but we can count on it being soon."

Allenby rubbed his chin. "The size of the Arvanian force?"

"No more than a battalion; the UQ would have to notice anything larger. But," Painter dropped his glance, "it should be enough to do the job. They'll be carrying sustained burst beamers for light weapons and probably pulse beamers and disruptors for their heavy weapons company. In addition, the Arvans are tough."

"What about our Montagnes? Aren't there around two hundred on Momus?"

Painter nodded. "About half of them are technical personnel—mechanics, medics, electrical and computer types—no more combat qualified than clowns. . . ." Painter noticed Great Kamera, Master of the Tarzak clowns, raising an eyebrow in his direction. "No offense, Great Kamera." The lieutenant turned back to Allenby. "Subtract them and the ones who are unfit because of age; and we have, perhaps, a dozen combat soldiers equipped with nothing but their bare hands."

"And?"

"And, if this were a problem back at officer's school, I'd pick the better part of valor and I wouldn't be marked wrong."

"Impossible."

"I know."

"What's the alternative, then, Painter?"

"Guerrilla warfare. Avoid direct confrontations, hit-and-run, wear them down . . . make life on Momus a hell for the Arvans. . . ." Painter looked down and shook his head.

"What is it? What were you about to say?"

Painter pursed his lips, then looked up. "To make it a hell for the Arvans, we will necessarily make it a hell for ourselves as well. A war such as that is a contest of spirits—guts. To increase the price of conquest to the Arvans, the people of Momus will have to pay a price. It might take years. They may wear us out first—"

"Hah!" Everyone in the room turned toward Dorum,

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strongman and Master of the Tarzak freaks. "Painter. You suggest that Momans lack spirit?" Others in the room nodded their approval.

Painter rubbed his eyes, then dropped his hand. "I have seen such a war before, Dorum. It was used against the Montagnes six years ago on Hessif as part of the rebellion. I saw my company commander blown to pieces by a small child wired as a walking bomb. . . . She asked him for water." He stood away from the wall. "Do you have the spirit to wire yourself as a bomb, Dorum? Or to wire your daughter or wife? That's what the Hessifs had for spirit, Dorum; and it wasn't enough. We cracked them. The Montagnes broke the rebellion."

Allenby looked at the lines deepening on the faces in the death-silent room. "Are there any other suggestions?" No one moved. "Very well, Painter, where do we begin?"

Oblivious to his battle cruiser, *Sword*, hurtling toward the planet Momus, the commander of the Arvanian mercenaries, Naavon Dor, sat in his couch playing his stylus against the screen that covered one of the bulkheads to his quarters. With rapid, sure strokes, images of Arvan's bleak mountains and harsh winds bending the filmy vegetation appeared on the screen. Naavon's screen could have shown his drawing in motion—the grey clouds slipping beyond the mountains, the dia trees whipping back and forth—but he preferred to draw in still and achieve the same effect. In the foreground appeared the edge of a cliff, and upon the cliff appeared a whirl of lines and shades that soon became a likeness of himself—tall, smooth head held erect, night-black eyes staring from under prominent brows at the distant mountains. Naavon hesitated a moment and studied the likeness. The figure wore the old-style high collar and crossed belts of the land mercenaries. Naavon frowned, then recognized the figure. *My father; why am I thinking of you now?*

"Naavon?"

The field officer turned from the screen to the compartment hatch to see his second-in-command leaning half through the opening. Naavon deenergized the screen, erasing the image, and tossed the stylus on the couch's armrest table. "What is it, Goss?"

"Fingers shuttled over from his command ship and wants to see you."

"By that racial slur, Goss, I assume you mean Admiral Sadiss."

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"The same."

"It may interest you to know, Goss, that Sadiss—as a Vorilian—can no more help having fourteen fingers than we Arvanians can help having ten."

"Yes, Naavon." Goss, old soldier and the field officer's faithful friend, cast his eyes down in mock shame, the hint of mischief at the corners of his mouth. "I bet he can tickle up a storm, though."

Naavon shook his head. "What does our patron's agent want?"

Goss grinned. "He wishes to bring charges against one of the men."

The field officer raised his eyebrows, then nodded. "Very well, Goss. Please show the admiral in."

Goss turned from the compartment and shouted over his shoulder. "You! In here!" Goss stepped into the compartment, took a seat facing Naavon and awaited the appearance of the Vorilian admiral.

Sadiss entered, and the Arvanian commander saw the squat humanoid, clad in black cape and suit, looking around the compartment for a place to sit. Naavon pointed to a stool. "It's the best I can offer, Admiral."

Sadiss glared at Goss's seated figure, then turned to Naavon. "I shall remain standing."

"As you wish." Goss lifted one booted foot, dropped its heel on the stool, then crossed it with his other boot. Naavon wondered if he should point out to the Vorilian that Goss acted the same with Arvanian officers. He shook his head and turned back to Sadiss. "And, your business, Admiral?"

"A soldier in your third company: T'Dulna. I am bringing formal charges of treason again him."

Naavon nodded. "I see. What did he do?"

"Defeatism. He spoke disparagingly of our glorious mission."

"Hmmm. That is serious. What did he say?"

"He called our mission of liberation an invasion, and he implied that it was an act of cowardice to bring modern armed force against what he called 'an innocent society of clowns and jugglers'."

Naavon nodded. "And you heard T'Dulna say this?"

Sadiss turned to the open door and waved his arm. "Emis, Yust; in here!" Two Arvanian soldiers entered the compartment and stood at attention next to the admiral. "These two heard him

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and reported his treason to me."

Naavon leaned back in his couch and clasped his fingers over his belly. "I see." The field officer studied Soldier Emis, then Soldier Yust. Nodding, he turned to Goss. "Have these two mustered out of the unit and get them off my ship. If the admiral won't take them on his ship, throw them outside and let them walk."

Goss stood and rubbed his hands together. "Yes Naavon; my pleasure." Goss walked between the soldiers, grabbing each by the arm, and dragged them backwards out of the compartment. The one called Emis looked pleadingly at Sadiss before he left the room.

Sadiss fixed his eyes on Naavon. "What is the meaning of this, Field Officer?"

"The invasion of Momus is an act of cowardice, Sadiss, and speaking truth is not treason on my ship."

"It exhibits a lack of loyalty to the Tenth Quadrant!"

"True." Naavon nodded. "Very true. But neither is that a crime on my ship. The men of this battalion owe their loyalty to me and to each other. No other loyalty is required, which is why you can have your two spies back. I won't have them causing mistrust in the ranks."

"What am I supposed to do with them?"

"Add them to that collection of criminals you call the Moman Liberation Army."

"Criminals? Field Officer Dor, they are representatives of the oppressed peoples of Momus who have requested the aid of the Tenth Quadrant to overthrow—"

"Be still, Sadiss! Feed your fiction to the United Quadrants, and not to me. Your liberation army is nothing more than murderers, thieves, and cheats exiled from Moman society, and your excuse to land troops on Momus without interference from the UQ. That is right, isn't it?"

Goss entered the compartment and resumed his seat. "Naavon, I stuffed them into Sadiss's shuttle."

The field officer nodded, then turned back to the Admiral. "I imagine that concludes our business, Sadiss."

"Not quite, Dor. Your soldiers are sworn to—"

"*My* soldiers are sworn to follow *my* orders. Your superiors hired me to secure Momus for the Tenth Quadrant, cash on delivery, which we will do—" Naavon grinned. "—unless we get a better offer. Meanwhile, we don't have to like what we are doing; be content that we are doing it. That will be all."

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Sadiss turned his glare from Naavon to Goss, then back to Naavon. "This isn't the end, Dor. I am the appointed commander of this mission—"

"That *will* be all, Sadiss. Now, do you wish to have Goss escort you to your shuttle?"

Sadiss turned abruptly and marched from the compartment.

Goss shook his head. "Naavon, he will make trouble for us. The warlords of the Tenth may listen to his prattle."

Naavon laughed. "Goss, old friend, you really don't see, do you?"

"See what?"

"Admiral Sadiss is an incurable romantic. I'm sure he thinks of himself as a liberator and our mission as one of liberation. The Tenth's warlords, however, are not at all the dreamy fellows Sadiss would like them to be."

Goss scratched his nose. "If I didn't see before, Naavon, I see even less now."

Naavon reached, picked up his stylus and energized his drawing screen. As he talked, he stroked in a grotesque representation of Sadiss. "Goss, you must understand the philosophy behind the Tenth Quadrant; it's interesting, if you don't get in its way. They feel that the Vorilians are destined to rule the universe."

Goss shrugged. "Sadiss feels no differently."

"Ah, but there is a difference, Goss. The present warlords, and all the warlords before them, are serving an idea. Sadiss is serving himself. The warlords see the Vorilians as the eventual rulers of all that exists. Sadiss sees himself as *the* ruler. The warlords are content to push until resistance is met, then back off and wait, letting the next generation of warlords make the actual kill. It is a ruthlessly slow, plodding plan of conquest; not enough to upset the races that surround them, but enough to eventually succeed. Take our own little mission, for example. Here we are, an insignificant military force being sent to secure an insignificant planet for the Tenth—in scale with the universe, scraps of dust; too little to be concerned about. 'It is nothing to us,' say the Quadrants, 'let the Tenth have it.' And the Tenth will take it, my friend, and add it to all the other scraps of dust it's gathered, because enough of these scraps of dust—"

"Make up the universe." Goss frowned, then raised his brows. "Sadiss?"

Naavon shrugged. "It is a plan that must take a thousand generations to work; Sadiss doesn't have the time. He serves his ego,

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while the warlords serve a destiny."

Goss pulled a small wooden flute from his blouse, put it to his lips and ran a few scales. "Where should we be in this, Naavon? If what you say is true, the warlords will level their sights on Arvan someday."

Naavon leaned back and pressed the animation program for the screen. "We will be long gone by then." The field officer shrugged as the image of Sadiss jerked and stumbled on the screen. "Even though Arvan will be absorbed, think of the grandness of the plan, Goss. The ghosts of an army of warlords will be able to look back at what they have done."

Goss tweeted out a short comic phrase in time to the screen figure's stumble, then took the flute down and slapped it against his hand. "I wouldn't want to live under the Tenth."

"That's not the point, Goss." Naavon held out his hands. "You and I, Goss; what have we that will remain centuries from now? As soldiers, perhaps we have set certain events in motion, but they can be easily countered by other events. I draw my pictures and erase them, and you play your excellent little tunes that disappear into the air. But the warlords of the Tenth are changing the universe, whatever that change might be."

Goss put his flute to his lips, then lowered it a bit. "You approve?"

Naavon shrugged. "Compared to the event, what does the approval of a mere soldier amount to?"

"Nothing, I suppose. And that applies to Sadiss as well, which is why he can't make trouble for us?"

"Exactly. The warlords hired us to do a job; as long as we do that job, they will be satisfied."

Goss played another short phrase, then frowned. "Naavon, what if Sadiss could accomplish, in his lifetime, the plan of the warlords?"

Naavon turned from Goss and studied the screen. "If I thought he could accomplish the plan—or defeat it—I would serve him, I think, to be a part of it. I would like to be responsible for some kind of permanence, even if it's negative, but . . ." The field officer shrugged.

"But, Naavon, you'll settle for two meals a day and the company of eight hundred sorry soldiers."

Naavon laughed. "The ones who live long enough." He picked up his stylus, stopped the animation and flicked in more lines, aging the figure of Sadiss by eighty years. As Naavon ani-

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mated the figure, Goss trilled off into a halting, ragged melody, "The Last Of Us To Die."

Squatting at the edge of the forest north of Arcadia, Oswald Painter, former Montagne lieutenant, scanned the desert and sky and found them clear. *They will not always be so. Allenby has high hopes for his magicians and fortune tellers,* he thought, *that they will fuddle the Arvans and foresee their plans.* Painter snorted and stood. They will need more than that.

He turned into the forest and pushed his way through the thick underbrush until he came to a small clearing. There he stopped and eyed his rag-tag collection of roustabouts, freaks, clowns, tumblers . . . *and, at least, one knife-thrower. Perhaps he will be of some use.* Painter held up his hands. "All right, people, listen up." He motioned them into the center of the clearing. As they shambled in and formed a half-circle around him, Painter looked at their faces, seeing boredom on one, excitement on another and mischief on still another. *Children playing soldier. Whatever it takes to make a guerrilla fighter, these people don't have.* "We have a lot of work to do and not much time—"

"Painter." A ragged fellow in black-and-scarlet held up his hand and Painter nodded, "Painter, I am Roos of the Anoki magicians."

"Yes?"

"There is still the matter of payment to be settled."

"Payment?" *Great Juju, what am I doing here?*

"Of course. Our being here is of value to you, is it not?"

That is the question, isn't it? Painter shook his head. "This is different."

"Different? Different how?"

"We're here to learn how to defend your homes—your planet!"

Roos half-closed his eyes and held up his head. "Is our being here of value to you?"

"Of course!"

Roos shrugged. "Then it is of value to us."

Shaking his head, Painter reached under his robe to find an empty purse. "It seems that I am a little short."

A woman in white short robe held up her hand. "I am Fayda of the Sina cashiers. If I might advance the instructor a small loan?"

Painter looked at his charges, then smacked his right fist into

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his left hand. "You silly people are staring a blood bath square in the face, and you're standing here trying to turn coppers on it!" *They are insane; absolutely yang-yang!* Painter let out his breath. "All right! How much?"

The recruits haggled among themselves for endless minutes, then a fellow in clown's orange stepped forward. "Two movills each."

The cashier from Sina counted the house, then reached within her robe and produced forty-four of the copper beads. As she handed them to Painter, she grinned. "There is, of course, the small matter of interest."

Painter took the coppers and glared at Fayda. "Of course! And, how much would that be?"

"Ten percent."

"Ten . . . that's robbery!"

Fayda shrugged and waved her hand at her companions. "You must admit the risk I take is considerable."

Painter nodded, then passed out the coppers. *She sees it, too. If an unlearned copper counter sees it, what am I doing here?"* After dropping the last two coppers into the last outstretched hand, Painter resumed his place in the center of the half-circle, remembering exile to be the penalty for failing to pay debts within a reasonable length of time. He looked down, scratching the back of his neck. *A few more sessions like this and I'll be in hock up to my ears.* He nodded once, then looked up. "Before we begin, there is the small matter of the payment for my services."

Roos looked at his companions, then back at Painter. "How much does the instructor charge?"

Painter folded his arms. "Three coppers apiece."

"Thief!" cried a freak from the back. "We only charged two!"

Painter shrugged. "A war is about to leap square in the middle of your chests, and you have no idea what to do about it. I do. Is this knowledge of value to you?"

As the recruits grumbled, Painter heard footsteps coming up from behind. He turned to see Allenby smiling and shaking his head.

"Lord Allenby."

"I see things are progressing well, Painter."

Painter snorted. "May I ask what brings you here?"

Allenby nodded. "I have come to congratulate you, Painter. By my appointment, you are now the official military commander of the Moman Armed Forces." Painter stared at the Great States-

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man while several comments competed for expression. Allenby turned and spoke over his shoulder as he left. "War is hell, Painter. War is hell."

Painter turned back to face his charges. Roos, a black frown on his face, held out Painter's coppers and dropped them into his outstretched palm. "Do you want to count them?"

Painter nodded. "Of course." Painter counted out the forty-four coopers, plus interest, handed them to the cashier and pocketed the balance. Fayda, the cashier, bowed.

"The instructor may depend upon a lower rate of interest in the future from Fayda. I see he is a man of means."

Painter nodded as an image of himself leading the Moman Armed Forces against Arvanian mercenaries flashed through his mind. *I must remember to ask Allenby how much the job pays. I don't think it will be enough.*

Koolis, Master of the Great Ring of Tarzak, stood in the center of the darkened amphitheater, his gaze caressing the starlit, cut-stone tiers. The circus, loaded into lizard- and horse-drawn wagons, had departed hours before. They had begged him to come, but Koolis remained behind. *My place is here, with the Ring. My obligations to the circus are met; the circus is safe.*

"Father?"

Koolis turned toward the spectator's entrance and squinted as a figure approached. "Lissa?"

"Yes, Father." The slender young woman crossed the sawdust, stopped, and lowered her pack. "You must leave; the invaders will be here soon."

Koolis turned his head away and crossed his arms. "We have nothing to discuss."

"You are angry with me still?"

Koolis snorted. "My daughter the soldier."

"I did not want to disobey you, Father."

"But you did all the same."

"We must fight—"

"Bah! We are keepers of the Ring, Lissa, not killers. And, if Momus would field an army, where is it? Why does it leave Tarzak to the enemy? Why does it not stand and fight?"

"Father, if we did face the Arvanians as an army, it would be all over for us. We must use different tactics."

"Skulking behind trees, slipping a knife into a back when no one is looking." Koolis spat on the ground. "Why are you here in

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Tarzak instead of hiding in the hills along with the rest of our brave soldiers?"

Lissa stooped over and lifted her pack, putting the strap over her shoulder. "I was sent to pick up the fireballs." She reached into the pack and held out an object the size of a small plum. "It is the magician's trick of intense fire. The case is made of raw cobit dough which forms two chambers inside. Each chamber contains a substance, and when the ball is crushed, the substances mix. You've seen the trick before and know how hot the fire is. These are special ones; three times larger than the ones the magicians use."

Koolis shook his head. "This is a fine day; magicians giving up their secrets—a fine day, indeed!"

Lissa placed the fireball into the pack, then turned and faced Koolis. "We are all giving up something, Father—"

Koolis placed a hand over Lissa's mouth. "Hush!" he whispered. "Quick, to the north entrance!"

They ran quietly across the sawdust, stopping as they came to the opening in the tiers. As torch-light flickered from the spectator's entrance, they flattened themselves against the entrance wall. Peering around the edge, Koolis began recognizing faces as they entered the Ring. Kardik the murderer, judged and exiled by the town of Tarzak, laughed and slapped another on the back. His companion, Haroman the arsonist, held up his torch and waved it over his head.

This Ring was my father's, and his father's before him.

Mysor—thief, murderer, and gang chieftain—walking next to a squat, black-clad Vorilian, laughed and jabbed the alien in the arm. The alien smiled.

This Ring has seen the finest art of Momus.

A squad of the earless Arvanian mercenaries, armed with rifles, were followed by a drunken gang of exiles, the blue marks of their judgements still on their foreheads.

In this Ring were born our two great laws.

Dazzul, thief.

Jokosin, thief and murderer.

Vaserat, murderer, and many more unfamiliar to Koolis but all bearing the blue marks of judgement.

"Hail, Mysor!" began one. The salutation was repeated by the others. "Hail, Mysor! Hail, Mysor!"

In the center of the Ring, Mysor held up his hands for silence. The gang of cutthroats quieted. "Who would the Great Ring have

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for its king?"

"Mysor!" shouted the small crowd. "Great Mysor, King of Momus!"

Koolis turned and saw the horror in Lissa's eyes. "Lissa, you must tell Allenby."

"Come with me, Father."

Koolis looked down into Lissa's face and kissed her on the forehead. "I must stay. You see what they do to my Ring?" Lissa closed her eyes and nodded. "Go, then, but leave me a handful of those doughballs." Koolis reached into Lissa's pack and filled the pocket of his robe with magician's fire. Looking up, he saw Lissa crying. "Have strength, little soldier. There will be many such moments before Momus is free of the invaders. Now, go!" The girl turned and ran quickly through the tunnel, out into the dark dusty street. When she stopped and looked back, her father was gone from the entrance.

The Arvanian squad leader climbed the low hill overlooking the road to Tieras, signaled his identification, then dropped into a hole occupied by three other mercenaries—two of them still alive. "All quiet, Ias?"

The Arvanian squatting before the portable sensor looked up and nodded. "For more than two hours, squad leader. Think they'll hit us again?" The night air was still.

"No. But keep a sharp eye." He cocked his head toward the dead mercenary. "How did T'Dulna get it?"

The soldier peering over the edge of the hole pulled something from his belt and held it back toward the squad leader. It was a guardless, thin-bladed knife. As the squad leader took the blade, the soldier nodded toward a tree next to the road. "That one down there, next to the tree. He threw it." The crumpled figure lay motionless.

"Threw it? That must be fifty paces, and an uphill throw."

"I make it closer to sixty paces."

The squad leader let out a low whistle. "You two hear about what went on in Tarzak?"

"What?"

"You know that Moman, Mysor?"

The soldier standing at the rim turned his head and spat. "What of him?"

"Fingers and his liberation army were staging a little ceremony to crown Mysor king of Momus when a local patriot took

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the opportunity to throw some kind of firebombs all over the place."

The soldier laughed. "This is the truth?"

"I swear it."

"Fingers and Mysor?"

The squad leader shrugged. "A little scorched, but still alive."

The soldier turned back to watching the area in front of his position. "Too bad. What of the bomb thrower?"

"No one will ever find the pieces." He climbed to the rim. "Keep alert, unless you want one of those bombs knocking on your palace door." He stood. "I'll have your relief here before morning."

The sensor operator pointed at the dead mercenary. "What about him?"

"He bothering you?"

"No."

"We'll be moving out in the morning. Grab his papers and turn them in to the company clerk before you fill in the hole."

The squad leader disappeared into the night and the two soldiers on guard avoided each other's eyes. The one on the rim sighted down his rifle at the fallen knife-thrower. During the raid

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the fellow had stepped out from behind the tree and lobbed the blade into the hole, catching T'Dulna in the chest. Before he was cut down, the knife-thrower simply stood, looking shocked, making no attempt at escape. The soldier shook his head, turned his gaze from the dead knife-thrower and studied the shadows.

The fortune-teller shook her head. "It is no use, Allenby. The Arvanians are not human; their futures are unclear. I cannot see them."

The magician nodded his agreement. "It is as she says, Allenby. They are not human; their minds are closed to my powers."

Allenby looked at the two shadows, then turned to a third. "Well, Painter?"

The figure shrugged. "At the rate we're going, we'll be finished inside of a month. More are joining up—especially after what happened in Tarzak—but we have no time to train them and no equipment." Painter sighed. "All I can suggest is to follow the circus to the Westlands and begin training all over again."

The fortune teller spoke. "What of our prisoner, Painter? With a prisoner, perhaps we can learn enough about the Arvanians—"

"No!" Painter turned from the fortune teller and faced Allenby. "The Arvanians have fought this kind of war before, and our two attempts to get prisoners have cost us over twenty men and women . . . we no longer have the time if anything is to be saved."

The Arvanian mercenaries under the command of Naavon Dor, moments after achieving orbit around Momus, put down shuttles near Tarzak, Arcadia, Kuumic, Miira, and Ris, the main population and road-network centers. Against no resistance, all five towns were occupied, with Admiral Sadiss installing a puppet regime in Tarzak and declaring it the legitimate government of Momus. A sixth force of Arvanians, mounted in swift moving hovercrafts and in higher-flying fighters, began sweeps of the countryside, routing out the Moman guerrilla bands. In the short span of nine days, the remains of the Moman Armed Forces—less than a third of its original strength—managed to flee to Anoki and escape by taking to the fishing boats under cover of a storm. The morning of the tenth day saw Naavon Dor declare the central continent secure. . . .

The vee formation of hovercraft streaked across the calm blue

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waters of the Western Sea, approaching the almost uninhabited land mass called, by the Momans, Westlands. High above the formation, Naavon's command vehicle—one of the *Sword*'s shuttles—banked to get a sensor reading on one of the islands that had begun appearing. Naavon looked down at the unspoiled jungle, then left the cockpit and returned to the cargo bay. The large compartment contained his command center, medical unit, and communications. The command-center staff sat glumly behind their consoles, making indifferent adjustments to already adjusted controls. From the back of the compartment Goss's flute wailed a song of mourning. Naavon walked to the screen that separated his and Goss's quarters from the cargo bay and looked through the door. Goss was stretched out on his cot playing his flute with a large brown jug nestled in the crook of his arm.

"Goss!"

The huge officer lowered his instrument and turned a bleary eye toward the door. "Hail, conqueror." Goss lifted his head and put his mouth to the jug, now upraised. He wiped his mouth on his uniform sleeve after he finished, then belched. "Have we found the elusive foe yet, mighty leader?"

"Goss, have you lost your mind? I could have you executed for this. What is that stuff?"

Goss shook the jug. "This? It's a local remedy for a troublesome conscience. It's called 'sapwine.' " He took another swallow, then held it out. "Care for a blow?"

Naavon took the jug and sniffed at it. "Goss, this will kill you before I have a chance to prop your carcass up in front of a firing squad."

Goss sat up, retrieved his jug, and took another gulp. "Good stuff. Helps you forget the work we've done these past ten days. Too bad the whole battalion can't go on a blind; it needs it."

Naavon sat on his own cot facing Goss. "Speak. What demon has its claw in you this time?"

"Sadiss. The creature could make mud out of diamonds." Naavon dropped his glance. "Yes, Naavon, you know what I'm saying. Every soldier in your command is saying the same thing. You saw what Sadiss's glorious liberation army did to that town? Porse, was it?"

"I don't know. I think so."

Goss drank again. "Doesn't matter, now, does it? All that looting and killing—just part of the warlords' magnificent plan, right? In the scale of things, just a few scraps of dust destroying a few

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more scraps?"

"Field Officer?"

Naavon looked up to see an orderly standing in the door. "What?"

"We've made landfall. Sensors are picking up something at the base of that small plateau a few minutes inland."

Goss laughed. "By the loving gods, Naavon, we've got them now! Hurry and give the orders. This is as much fun as shooting babies in a schoolyard—"

"That will be enough, Goss!" Naavon turned to the orderly. "I'll be out in a moment." The orderly nodded and left. Naavon turned back to see Goss stretched out again on his cot emptying the jug. Goss lowered the jug to the floor, closed his eyes and began snoring.

"Goss, you fool." Naavon whispered. "A mercenary is never on the right side nor wrong side of a war; a mercenary is just on a side—the side with the pay voucher." Naavon hung his head and looked at the deck. *I am telling this professional soldier the standard fare fed to raw recruits, and I don't even believe it myself.*

The Momans had fought with courage, if not with skill. The few modern weapons they possessed had been taken from the bodies of fallen mercenaries. The rest fought with whatever they had: firebombs, knives . . . Naavon smiled as he remembered that night outside the town called Ris. Arrows began falling into the Arvanian positions. *Arrows!* The first impulse was to laugh; and they all did, save the five mercenaries who died, wooden shafts protruding from their bodies.

Naavon shook his head. The orders from Sadiss were clear: slaughter every last defender. No quarter. He wanted no competition for his liberation army. One heavy-weapons sweep would probably do it—two at the most—if the terrain were clear. But the Westlands, with its rugged mountains and dense jungles, would require the time-consuming process of rooting the Momans out one at a time. It would require much from the battalion, and the men were long past looking upon this particular job as a war bearing even a shred of dignity.

Naavon looked at Goss. *The men have seen what Sadiss and Mysor are doing with their gang of criminals, and they have seen the desperation, the courage . . . the honor of the Moman defenders.* Naavon shook his head and left the compartment to step into the cargo bay, coming to a halt next to his communications operator. "Get me Sadiss."

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The operator coded in the signal and turned to Naavon. "Admiral Sadiss, field officer. Do you want the admiral on visual?"

Naavon shook his head. "Admiral?" he called to the blank screen.

"FIELD OFFICER DOR? HAVE YOU FOUND THEM?"

"Yes, Admiral. I plan to put down my force soon and attempt to make contact with the Momans by—"

"I REMIND YOU AGAIN: THEY ARE NOT MOMANS; THEY ARE REBELS AND TRAITORS. I ALSO REMIND YOU THAT I AM THE COMMANDER OF THIS MISSION, AND THAT YOUR ORDERS ARE TO SLAUGHTER EVERY—"

"Arvanians do not make good butchers, Sadiss. If I can bring them to the point of surrender, I will accept—"

"NAAVON DOR, YOU WILL ACCEPT NOTHING! DO I HAVE TO REMIND YOU, AS WELL, THAT I HAVE A MILITARY FORCE OF MY OWN?"

"You threaten me with a gang of thugs?"

"AND MY BATTLE CRUISER. I HAVE GIVEN YOU YOUR ORDERS, AND IF YOU DO NOT OBEY THEM, I WILL HAVE YOU HUNTED DOWN AS I WOULD ANY ANIMAL!

"I advise against that, Sadiss. That's a fight over which my men could work up some enthusiasm." Naavon nodded at the operator. "Break contact, then order the hovercraft force to prepare to put down." Naavon frowned, then nodded. "Better notify the *Sword* to go to full alert."

"Yes, Field Officer."

"What are you grinning at?"

"Nothing, Field Officer. Nothing at all."

Jeda of the Miira riders, temporary road boss of the Tarzak Circus, followed the juggler named Puga into the dank cave at the base of the plateau. The entrance was hidden behind a thick cover of brush and overhanging trees. He could see no guards, but he knew they were there.

The juggler held up his hand. "Wait here, Jeda." Puga disappeared around a bend, leaving Jeda alone with his thoughts. He looked toward the mouth of the cave at the jungle green. In the six days since the Arvanians had landed in the Westlands, the Moman defenders had begun holding their own. The invaders would strike, but their target would melt into the jungle before the Arvanians hit. At the cost of many lives, more Arvanian weapons had fallen into Moman hands; and the defenders were now trading lives with the mercenaries one-for-one. *While we sit safe in*

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the jungle, doing nothing! Jeda turned as he heard footsteps.

Puga's head appeared around the bend in the tunnel. "Come, Jeda. Allenby will see you."

Jeda followed the juggler around twists and turns until they entered a low, torch-lit chamber. Allenby sat crosslegged before a low table littered with hand-drawn maps. Allenby looked up. "Jeda. What brings you? Is all well with the circus?"

Jeda crossed his arms. "As well as can be expected."

"Meaning?"

"Meaning, we would join the fighting, Allenby. The entire company agrees; that's why I was sent."

Allenby nodded. "I see." He shook his head. "No."

"No? Do you have so many fighters that you can afford to ignore almost two hundred more?"

"Don't be a fool, Jeda."

"A fool?"

"Yes, a fool. Those men and women fighting out there—don't you know what the circus has become to them? It is their reason to keep going, their symbol, their banner. Do you understand?"

"I understand that we sit by letting others do our fighting for us. Momus has been without a circus before—many times."

Allenby rubbed his eyes, then placed his hands together on the table. "Jeda, the circus *is* Momus right now. Before the war, it was different—everything was different. But now, every freak, clown, and roustabout crouching in the jungle out there needs to know that the circus is intact, safe. If I allowed the circus to break up and join the fighting ranks, I would be serving the Tenth Quadrant's cause, not ours. Our spirit would crumble."

Jeda looked at the floor of the chamber. "Great Allenby . . . it is hard. It is a hard thing you ask of us."

Allenby nodded. "I know. Go and explain it to the company and make them understand. I am depending on you."

Painter entered the chamber and stood next to Jeda. "Lord Allenby, the Arvans are beginning the hovercraft sweeps again.

"Is the net ready?"

Painter nodded. "And the rockets."

"Will the rockets work?"

Painter shrugged. "We couldn't exactly test them without giving our positions away. The paper-and-bark tubes seem strong enough to handle the fireballs, but . . ."

Allenby nodded and stood. "We should be going, then."

Painter frowned. "I don't think you should be there, Lord Al-

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lenby. If things go wrong, which is highly probable, you shouldn't be in the area."

Allenby pursed his lips, then looked at Jeda. "You're right, Painter. Keep me informed."

Painter nodded, turned and left the chamber. Jeda shrugged. "I should be getting back to the company."

Allenby walked around the table and escorted Jeda through the tunnel. At the mouth of the cave, he placed his hand on the rider's shoulder. "Good luck to you, Jeda."

"And to you."

Allenby watched Puga lead the rider into the jungle until they were both out of sight. He waited another full minute, then turned to his right and ran through the brush to catch up with Painter.

In the hovercraft cockpit, Naavon pulled back on the wheel slightly and banked to the right. "See anything?"

Goss looked up from his sensor panel. "Nothing." The four armed mercenaries in back watched through the bubble canopy at the jungle below. Goss shook his head. "It was a mistake to split up and scatter the force, Naavon."

Naavon nodded and swung the hovercraft on a shallow arc to the left. "Probably, but this way we can cover the same amount of territory in one-tenth the time. If Sadiss would have let us use the shuttles from his ship, it wouldn't be necessary."

Goss laughed. "Naavon, if that piece of slime had kept his gang in check on the central continent, we would have enough of our own shuttles."

Naavon grimaced. The central continent had been secure, but Mysor's bully boys had stirred things up. Sabotage had left all but two of the shuttles from the *Sword* useless. "Goss, have you heard anything further from the second company?"

Goss shook his head and returned his gaze to the sensor screen. "My guess is that the resistance on the central continent isn't organized and isn't directed from here. I think it's simply a popular response to Mysor's political acumen. . . . Wait!" Goss adjusted the screen, then looked up and out through the canopy. "Eighteen degrees to the right, in that valley. I picked up motion readings, but they're gone now."

Naavon banked the craft to the right. "Let's take a look. We'll come in high first." Naavon guided the craft down the length of the valley, turned and hovered at the opposite end. "Readings?"

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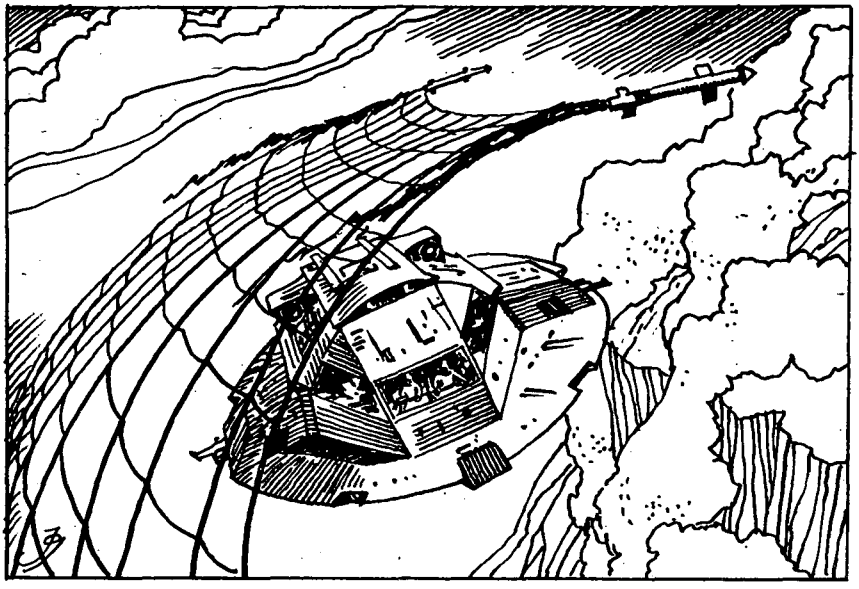

Goss shook his head. "Nothing on motion or electro-magnetic fields. Try it low and slow and I'll look for some heat."

Naavon pushed the wheel forward, aiming into the valley, and leveled the craft a few meters from the treetops. "Anything?"

Goss studied the screen. "Not yet." Bits and flecks of red appeared on the screen showing the rich animal life below, but none of the traces were large enough to be men. "Wait . . . no, the way it moved off it must have been an animal." Twin red streaks went up the sides of the screen. "Naavon—"

"I see it!"

Goss looked up to see two rockets pulling skyward, lifting a huge net. The craft lurched as Naavon attempted to avoid the trap, but one edge of the net was anchored to the jungle floor, making the rockets swing over, so that the net fell over the craft. Naavon struggled to land the craft upright, but it pulled sideways and slammed into a tree, then into a vine-covered rock wall. Naavon opened his eyes to see the craft on its side, the canopy shattered open and himself staring into the business end of a beamer. At the other end of the rifle was someone he recognized from the intelligence briefings: Oswald Painter. The young fellow grinned. "Well, well, Naavon Dor. Look at you."

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In the light of a single torch, Naavon walked around the small cave-prison examining the walls while Goss played a dreamy melody on his flute. The field officer halted his search for an escape route and looked down at his second-in-command sitting crosslegged on the cave floor.

"Seeing that four of our comrades are dead, Goss, wouldn't a serious tune be more appropriate?"

Goss lowered the flute and looked up. "In scale with the universe, Naavon, what are the deaths of four mercenaries? Next to the rock that is the plan of the Tenth Quadrant's warlords, we are but splashes of fluid, a hiss of vapor—"

"You twist my words with skill, Goss." Naavon crossed his arms and leaned against the cave wall. "Very well, old friend, let's hear it."

"Hear what?"

"Whatever it is you've been wanting to say ever since the *Sword* went into orbit."

Goss shrugged, played a short phrase and stopped half-way through a repeat. "We've been together a long time, Naavon." He smiled. "If you want, I know you can out-talk me with theories and ideas. I am a soldier and I do not think in terms of universes, thousand-century schemes, not the kinds of thoughts you have. Am I making sense?"

"Go on."

"Naavon, perhaps we are—as you say—scraps of dust; too unimportant to bother with. But I bother with them, because I *am* one of those scraps. If I could see and know the entire universe at once . . . but I don't. I see this cave around us; I see you standing there. In battle, I see enemies bleed, friends die."

Naavon squatted in front of Goss. "We are mercenaries, Goss."

Goss rubbed his chin, then tapped his flute against his knee. "These things I see, Naavon, are the important things to me. We are different. You see the destiny of the warlords shaping the universe; I see Arvan falling someday to an armed force—I see this filth, Mysor and Sadiss, serving the warlords by destroying a way of life. . . ."

"Mercenaries have no sides, Goss, except—"

"Except the pay voucher; I know. We can have no cause, Naavon; but I find myself in a strange position. I am in a war where I want . . . no, where I *have* to take sides, and I find myself on the wrong one."

Naavon stood. "Goss, in time this planet won't even exist.

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How can you lend yourself to this uncertain, miniscule corner of the present, when before you stretches unlimited future?"

"I will never see it."

"Aah!" Naavon turned his back. "What's the use talking to you?"

"Probably none."

The field officer looked at Goss. "Tell me, then, Goss: if this is how you feel, why do you not desert? Why do you not join the sorry forces of Momus? Why are you still here with me?"

Goss lifted his flute and studied it. "In the scale of things, Naavon, my reason is nothing—less than nothing: the oath of one soldier to serve another. As I said, it is nothing; but it is important to me." Goss resumed his playing.

Naavon looked up as a red-and-purple clad figure carrying a torch entered the chamber.

"Come with me. You two are to dine with Allenby," said the newcomer.

The wood fire in the center of the large underground chamber hissed and popped, casting against the walls great shadows of those seated around its warmth. Allenby glanced to his right at Gens the fortune teller, trying to catch her eye. Gens, however, was occupied, studying the two Arvanian officers seated across the fire from her. Allenby looked at the troubled face of Naavon Dor and couldn't believe the Arvanian's concern to be rooted in the fact of his capture. The one called Goss watched Dishnu, a minor clown from Dirak, do a comic pantomime of a man building a house with rubber tools. The clown finished and bowed.

Allenby clapped. "Excellent, Dishnu." He reached into his purse and withdrew several coppers. "Here."

The fortune teller handed the clown coppers, as did the roustabout named Painter. Then Dishnu faced the Arvanian called Goss. Goss reached into his uniform blouse and withdrew a wallet. "A fine performance, clown. Are Tenth Quadrant credits acceptable?"

Dishnu frowned. "Have you no coppers?"

Goss shrugged. "I would think this money to be a promising currency, considering everything."

Allenby laughed and tossed Goss a small purse. "There, I'll exchange your paper."

Goss handed the clown several coppers, then handed the purse to Naavon. The other Arvanian seemed startled, then took

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several coppers and put them into Dishnu's hand. Allenby rubbed his hands together. "And, now, perhaps a little magic?"

Dishnu sat down and nodded. "Yes, Great Allenby, I would see your illusion of the night flower."

Painter laughed. "Perhaps our guests would like to perform?"

Goss pulled out his flute. "My pleasure."

Painter shook his head. "Yes, but our suffering."

Goss pointed his flute at Painter. "If I am not mistaken, Painter, you wear the garb of a laborer—"

"Roustabout."

Goss nodded. "Yes, then can we see your act? Perhaps you would give us a demonstration of lifting, loading, and hauling?" As Painter blushed, Goss put the flute to his lips and blew a complicated exercise. Upon its completion, he trailed off into a sad, haunting tune. Others in the chamber, at other fires, halted their chatter to listen. Allenby felt tears well inside of his chest at the images of pain, loneliness, and empty existence that Goss's flute created in his mind. Before the war, it would have been just another tune. But as he listened, he knew it to be a soldier's song speaking of life risked, worlds conquered and lost, death achieved—an existence overflowing with events, yet devoid of meaning. Allenby looked up, surprised the song had ended. Painter leaned forward and dropped coppers into the Arvanian's hand, nodding.

Gens the fortune teller placed her hand on Allenby's arm as Naavon got to his feet, bent over and pulled a smoking brand from the fire. He turned, stepped outside the ring behind Dishnu, and began drawing the charcoal across the wall of the cave. Allenby could make little sense of the scrawl of lines and curves, but all the time Naavon drew, he felt Gens's hand tightening on his arm. She turned and whispered into his ear. "I have it! I can read them now!"

While the Arvanian officer drew, Gens motioned to a barker, slipped him a few movills and whispered into his ear. The barker nodded and crept back to his fire. The fortune teller turned back to Allenby. "I have already sent a message to Jeda to prepare the circus for performance."

"Why?"

"Great Allenby, you must suggest a truce to the Arvanians."

Allenby frowned. "Are you sure?"

Gens frowned back. "Am I a fortune teller, or not?"

"You are indeed a fortune teller," Allenby whispered, "but

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Naavon Dor will want to know the reason for the truce."

"Tell him you must have a truce in order to hold a performance."

"A performance—"

"Excuse me," interrupted Goss. "Is it customary to maintain this chatter during another's performance?"

Allenby raised his eyebrows and shrugged. "My apologies, Goss. No offense to your commander was intended."

Goss nodded and turned his glance toward the drawing taking shape at the end of Naavon's stick. "Remember that, when it comes time to pay my commander's fee for his art."

Two days later, Allenby stood on the edge of a large clearing, watching the two companies of armed Arvanian mercenaries mingling with three hundred of his own armed Moman defenders. Both groups were gathered around the clearing waiting for the parade to begin. *It is enough to test one's faith in fortune tellers.* A blowing shriek from the steam calliope signaled the start; and from the far edge of the clearing, the crowd parted, letting in a lead of costumed clowns followed by a string of performing lizards, horses, jugglers, tumblers, a float carrying the flyers, and then the calliope itself bellowing out a march that could be heard for the distance of a two day's walk against a strong wind.

Arvanians and Momans, for the most part, avoided each other. But, in several small gatherings, Momans pointed out the various stars and acts, explaining them to curious mercenaries. By the time the sun began setting, half-way through the show, the torches illuminating the perimeter showed Momans and Arvanians passing jugs of sapwine, discussing the merits of the various acts and . . . laughing.

Allenby felt a presence at his side and turned to see Naavon Dor looking back at him. "Field Officer Dor."

Naavon nodded. "Lord Allenby. Could I ask a question?"

"Of course, although I can't guarantee an answer."

"This truce, this circus; why did you propose them?"

Allenby shrugged. "Do you know of our fortune tellers, Field Officer?"

Naavon frowned, then nodded. "The one called Gens, she saw much in my drawing, did she not?"

"And in Goss's song."

Naavon looked down, then shook his head. "Gens saw in me something that would not let this circus be destroyed. How does

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she see where I do not?"

"It is her training."

Naavon nodded. "And does she see if this truce can be made into a peace?"

"Not everything is clear to a fortune teller's eyes, Naavon Dor. What is clear is that we do not serve anyone's destiny save our own, that of the circus."

"Where did Gens see this in me?"

Allenby shrugged. "It's hard to explain, and I don't understand it myself. I doubt if Gens understands it. She saw in your drawing many meanings, yet many contradictions." Allenby shrugged. "I saw neither. I saw a great hand with a hundred tiny galaxies in its palm, another sad face and a lone fist." Allenby rubbed his chin. "Will peace come?"

Naavon looked up, his eyes widening in horror. "Sadiss!"

Allenby looked up and saw the streaks of shuttles in the sky. "What is it? What kind of treachery is this, Dor?"

But Naavon was already running into the clearing, shouting for the torches to be extinguished and for everyone to take cover. He disappeared from Allenby's view just as a wall of flame erupted from the clearing.

Before the Arvanian commander died, he ordered his second-in-command to join the Arvanian forces with those of Momus to destroy Sadiss and the puppet government of Mysor. To Allenby he said: "Take the circus and spread it throughout the Galaxy—the Universe. We all follow gods; mine was destiny—an empty spirit. Follow your god; it is the circus; it is your strength."

Within four months Mysor and his followers were dead and Admiral Sadiss had escaped on his command ship, but not before inflicting serious damage to the Sword. *Damaged as well was the circus, which took nearly a year to replace its acts and equipment. During the same year, the home looms of Momus turned out the canvas, loggers brought down the timbers, and the mines of Kuumic turned out the fittings to raise the big top. Arvanians and Montagnes brought the* Sword *to full readiness, and renamed it the* City of Baraboo II. *After two centuries, the circus was back on the star road.*

Bunsome put down the last sheet of Shelem's chapter and looked up at the assembled company. Lissa, ringmaster, blew her whistle and Goss, the Arvanian, leaned on the keys of the

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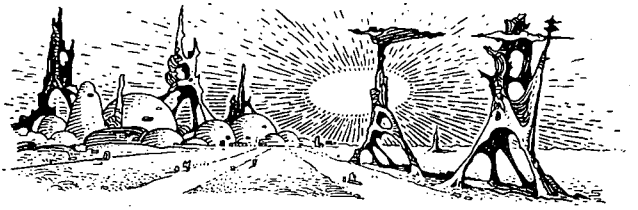
calliope. The sounds echoed in the vast cargo hold as the company cheered, then moved out into the night, toward the streets of Cukyu.

After they were gone, Bunsome nodded. *We will succeed; we cannot fail.* He looked toward the open door of the hold. *And I shall be a priest. Thank you, Shelem.*



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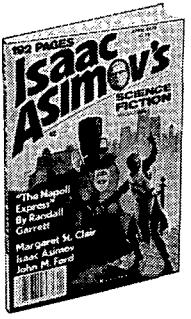

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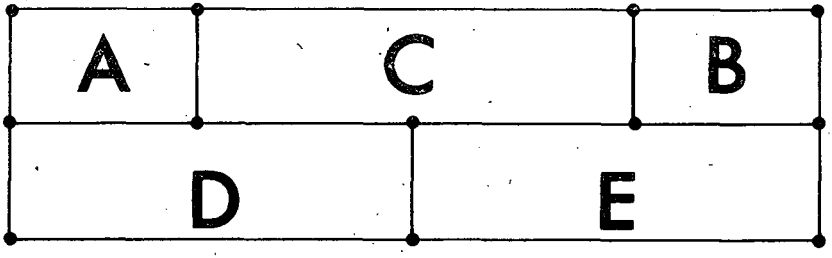
TANYA TACKLES TOPOLOGY
by Martin Gardner

The Bagel, a spaceship so-named because it was shaped like a bagel, was on its way back from a mission to the center of the Galaxy. (See "The Voyage of the Bagel" in *Isaac Asimov's Science Fiction Magazine*, May-June 1978.)

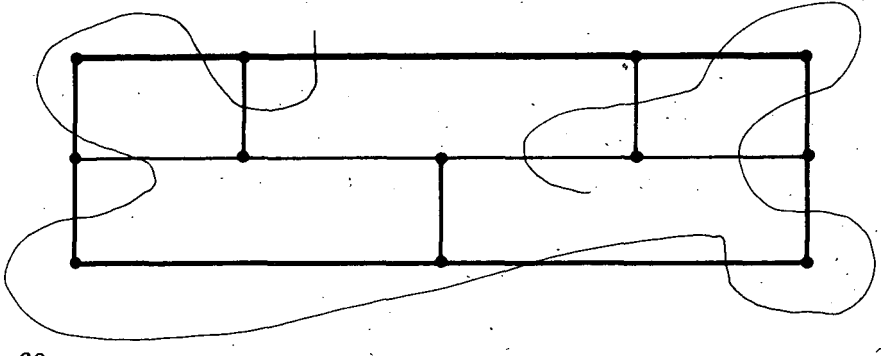
"What's topology, father?" asked Tanya, the ten-year-old daughter of Ronald Couth, head of the Bagel's computer science crew.

"Roughly, it's the study of the properties of a structure that remain the same when the structure is distorted in a continuous way," said Couth. "But let me give you an old puzzle that will help you understand."

Couth found a piece of chalk, and on the bulkhead (wall) of the spaceship sketched the following pattern:



"The problem," said Couth, "is to draw one continuous line, starting anywhere you like and ending where you like, that will cut once and only once across each of the sixteen line segments in this figure. For example, you might draw a line like this." Couth drew a line that twisted around as shown below:



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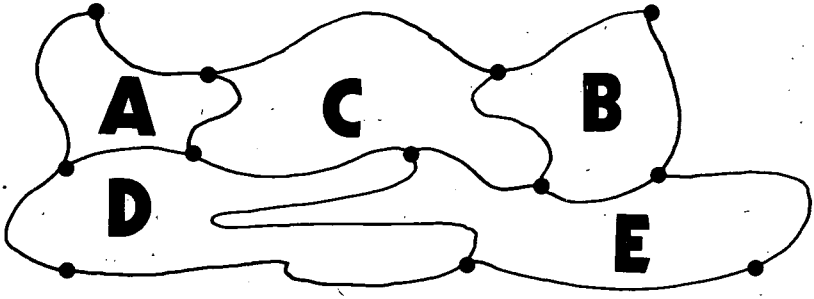
Tanya stamped her foot. "Now you've solved it!"

"Oh, no," said her father. "Look more carefully. You'll see that my line missed one segment. Now the reason this is a topological puzzle is that if you imagine the figure drawn on a sheet of rubber, and the rubber stretched any way you like, the puzzle remains unchanged. For instance, we could distort the figure like so:



"Since the figure can be stretched and twisted, the question of whether the puzzle can be solved or not is topological. Actually there *isn't* any way to solve it unless you cheat by drawing your line through one of the vertexes or along one of the line segments."

"If it's impossible," said Tanya, "why should I waste time on it?"

"Because," said her father, "I want to see if you can *prove* it can't be solved. If you succeed, you'll learn something about how to prove certain theorems in elementary topology."

Can you prove that the puzzle has no solution? See page 80 for a simple proof.

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ON EVENINGS BEYOND THE FIELDS WE KNOW

by John M. Ford

art: George Barr

Here is the second of a set of articles on SF and fantasy games which have recently become popular. Mr. Ford has just sold his first SF novel, Air and Angels, *to Pocket Books.*

"Cleaned out a castle last night," one of your friends says. "Fifteenth-level wizard in the dungeon . . . he polymorphed himself into a Bronze dragon, but we Timestopped him and hit him with a 7-die lightning bolt, and mopped up with polearms."

As you gather your wits, another companion replies: "Actually, I *am* a Bronze dragon. Sixteenth-level."

Your "*What?*" betrays a certain lack of composure.

"The *game*, of course," your friends chorus. "*Dungeons and Dragons.*"

All around nowadays are dungeons and dragons and wizards and space marines and the best thieves in Llynegath too. These are the elements of a new sort of parlor game: the fantasy, or science fiction, rôle-playing game.

Rôle-play games do not use boards or decks of cards. They use pencils, and acres of paper, and dice, and rulebooks of an often awesome complexity. They provoke group interaction (and after-the-fact tale-telling) of a sort never seen around a card table.

What does "rôle-playing" mean?

In "conventional" games such as bridge or tennis or chess, the game is played for its own sake. If the player fantasizes being Oswald Jacoby or Chris Evert or Fred Reinfeld, he or she is not likely to talk much about it.

In a game such as *Monopoly*, the players are in the situation of making real-estate deals—but they are not projected very deeply into that situation; *Monopoly* is not really about real-estate, but rather about squeezing your opponents.

In the rôle-play (or *adventure*) game, however, each player receives a *character* who is far more than a chesspiece or the battleship or hat on the *Monopoly* board. The RP character has strengths and weaknesses and a personality, to be fleshed out by the player

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behind him (or her, because as many females are attracted by adventure games as males.)

The RP game is an ongoing story, rather like a piece of improvisational theatre. The players/characters act out the motions of a storyline, regulated by an additional player who fills the functions of scenarist, set dresser, and director. This director, called a Gamesmaster (or Dungeonmaster, Judge, Referee), plans out the landscapes across which the players will travel, plays supporting roles in the dialogue and action, and acts as the hand of a crafty (but not malevolent) Fate.

Discussions of the game form are inadequate to communicate it. It must be illustrated by example. By far the best way to learn is to find a group of players open to new members, or, failing that, start one. As a third-best measure, however, the following is a dramatized example of a simple game, played among beginners.

The game is called *Starquest*, because to the author's knowledge no one has trademarked that name yet. It incorporates elements of a great many commercial games—including, for instance, both magic and spaceships. At that, these elements have been greatly streamlined for clarity: to explain a game as complex as, say, the most recent edition of TSR Games' *Dungeons and Dragons* would require tens of thousands of words—and indeed, the current rulebooks are impressively-sized affairs.

Since the flow of the game so closely resembles a story being told, the structure of this article follows the elements of a story: Character, Background, Conflict, and Plot. It will be seen how these elements articulate together into the game as a whole.

Key points—those general to all the games (for the variance in specifics is great) will be indicated by §, and *italics*.

An explanatory note on random numbers and dice: Adventure games make an extensive use of random and partly-random events, and dice of unusual types to generate unusual random numbers. In addition to the common six-sided dice, there are four-, eight-, twelve-, and twenty-sided varieties; and the five Platonic solids, with numbers engraved on them. Also used frequently are "percentile" dice: a pair of twenty-sided dice, of different colors, each marked with the digits 0 to 9 twice. One color die is always read first, giving an outcome of 00 to 99, or 01 to 100. Finally, the singular of "dice" is "die."

CHARACTER: Playing Many Parts

A story is people. People are the heart of the RP game, both the

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players and the imaginary characters—crafty dragons, evil wizards, starship captains and interstellar emperors—they will meet in the course of their adventures.

Each player will have a "character card" on which are recorded the important facts about the personality he/she is playing. In the *Starquest* system, the card would look something like this:

NAME: ***Allan Quarterhour***
STRENGTH: ***10*** **INTELLIGENCE:** **5**
DEXTERITY: ***8*** **EGO:** ***12***
GUILD: ***Warriors***
FAMILY: ***Blacksheep son of an Overculture Naval officer***
EXPERIENCE: ***0***

Breaking this down one set of elements at a time:

"Allan Quarterhour" is not the player's name, but the one he or she (it doesn't really matter) has picked for the character. Some Gamesmasters prefer the players to have game names; some find it confusing; some don't care.

§ *The "depth of immersion" in the game world varies according to the tastes of the participants.*

Strength, Intelligence, Dexterity, and Ego are collectively called *Requisites*. The numbers are determined by rolling two ordinary, six-sided dice. It is assumed that only above-average people get to be adventurers; if a player should roll a character whose Requisites total less than 28 (four times an average roll of 7) he may discard the character and try again.

The Strength Requisite determines the amount of weight the character can lift and carry, and his chance of successfully performing "feats of strength" such as snapping chains or holding a door shut against hordes of attackers. Allan's roll of 10 is well above average.

Intelligence represents a character's ability to learn and memorize. Allan's roll of 5 means he is incapable of mastering such skills as piloting a starship, and though magic works in the world of *Starquest*, Allan would be limited to memorizing five spells, each of which he could do once per week. He therefore leaves the study of

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magic to those better qualified.

Dexterity measures the chance a character will have of hitting his enemy when he uses a weapon. There are also "feats of dexterity," such as picking a lock (or a pocket); firing a gun from a wobbly ladder without falling off; putting on a spacesuit before his ship loses atmosphere. Allan's Dexterity of 8 is slightly better than average.

Ego is the character's strength of will. It determines his chance of persuading other characters with his appearance and voice; of resisting hypnosis and certain forms of magic. It is also a measure of Allan's ability to lead, should he find himself in command of an armed force. Allan's Ego is 12, the maximum; he is a born leader, practically impossible for others to dominate, but who persuades at a word.

§ *Requisite numbers measure inherent physical and mental abilities.*

These numbers considered, Allan decides he will join the Guild of Warriors. His other choices were Magicians—not likely; Engineers—for those of high Intelligence who don't care for magic, not for Allan; Artificers and Thieves—Dexterity not high enough; and Traders—Allan's Ego was more than good enough for this, but he prefers the "more adventuresome" life of a soldier.

There is a chance Allan will be blackballed from the Guild; since his father is a Naval officer (of which more in a moment) the chance is small—one in twenty. A 20-sided die is rolled and comes up 14. Allan is admitted.

As a Guild member, Allan is entitled to wear insignia of rank, even when not on active duty. He will receive priority of hiring if he applies for mercenary work, and is guaranteed a short-term job with the Overculture Armed Forces if he's broke and desperate. He also must pay 5% of any military wages he earns into the Guild General Fund.

§ *Characters are usually organized into "classes" or "types" such as Warriors, Magicians, and Thieves, each of which has its own set of benefits and obligations.*

A series of dierolls on a special table determined Allan's father's profession, that Mr. Quarterhour was still living, and that his son had left home under trying circumstances. Another roll gives Allan

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the moderately large sum of five thousand Credits (C 5000) anyway; possibly a bribe to get out of the house quietly.

Allan's player hypothesizes (without dice) that Allan is a darkly handsome, dashing young man who cuts quite a figure in his lieutenant's uniform—but not too clever, and always in over his head.

This kind of interpolation between the numbers is what gives the game its color and flavor. It should be noted again that *Starquest* is a deliberately simplified system; most games contain more details, more tables to determine such things as appearance and background. Four Requisites is an unusually small number, though not the smallest in use; six is more common, and some Gamesmasters use a dozen and more, assigning numbers for Swimming and Gambling Abilities, Psychic Ratings, Disease Resistance, and so forth.

Experience represents the victories Allan has won in "life"; the foes defeated, the treasures won, the plans carried through. Experience Points (EP) can be considered Allan's "score" in the game, though he is not actually competing against the other players but playing alongside them. The Gamesmaster awards EP according to certain standard values—defeating a human of similar abilities to his own in single combat is worth 20 EP, for instance—and at his discretion. GMs are very individual about awarding Experience. One might give Allan ten points for winning over a lady pirate; another might disallow such because Quarterhour's Ego makes the winning too easy. A third might compromise by matching Allan against an equally strong-willed lady, and to the victor—

Experience points have a direct value in the game as well. For each 100 EP Allan earns, he is raised one "Level." This is an improvement in his natural abilities, gained through sweat and application. In *Starquest* Level is used as a dice modifier. Allan's presently Level 0, and has no such adjustment; after 100 Points he'll be Level 1, capable of adjusting certain dierolls by a point up or down. At 10th Level, he will clearly be a formidable character—though, of course, he will be facing equally powerful opponents.

§ *Advancement of abilities takes place through an "earned experience" system.*

BACKGROUND: Worlds Within Worlds

Once the character is created, it is necessary to set him down in a world in which to have adventures, and usually to provide him with some adventuring-companions.

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Starquest takes place in the Overculture, a loose organization of forty human-inhabited planets. Humans are dominant on twenty of the Worlds. Ten are controlled by the Rasheni, a wolf-like race who do not like humans but are not openly hostile. Ten more belong to the Zu'ul, humanlike but amphibian, who slightly favor Man over Rashen because of shape, but are generally indifferent to both.

Of the twenty Human Worlds, magic works on ten, as a result have not developed much machine civilization. On the other ten, including Earth, technology is dominant. There is a certain mistrust between Engineers and Magicians, but no great anger. Clarke's Law is seen to apply: "A sufficiently advanced society is indistinguishable from magic." Also, the Koniichev Hyperdrive for faster-than-light travel is a mechanical device that draws power from the magical energy field, and requires both guilds to maintain and operate it.

On the planet Castelnuovo (Human; Magic-positive) in the city Tarano, in the elegant atrium bar of the Hotel Pisa (which tilts ten degrees from the vertical and is held up by gravity generators) Allan Quarterhour meets with four other people.

Beatrice de'Nuovo is a Magician, the thirty-fourth in line for the Monarchy of Castelnuovo. She figures she is too far from the throne to waste her time as a courtier, and wants to make her own way in the Overculture.

Carl Tanner is an engineer, a starship pilot. He's taken out a large loan to buy a small space packet, the *Lemminkainen*. It's all he owns, and he needs some quick Credits to keep it.

Dade Odens would like to be an Artificer (the polite name for a Guilded Thief) but was blackballed. A big score, she believes, will change the minds of the membership council; and if not that, she knows that a large bribe will.

Epaimonidas is a Zu'ul Trader. (His real name sounds like an unstopped drain.) Rasheni raiders hijacked his freighter; he escaped with his life, but not much else. He has brought these people together with a plan: to hit back secretly at the Rasheni, revenging himself and making them all wealthy in the process.

"Isn't that illegal?" Carl asks. "Library computer."

The Gamesmaster, in a droning "computer" voice, tells the players that indeed it is; it's piracy, in fact.

"The Rasheni pirated *me*, and *they* got away with it," says Epaimonidas. "Are you in or aren't you? I can find somebody else if you're not."

"We could always turn you in," Dade says thoughtfully.

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"I can always find an assassin who's hungry—or four."

"Tell us some more," Beatrice says. "Will we be on a magic-positive world?" She does not add that her powers are equally useless aboard a starship, since the K-Drive soaks up all the magical energy around it.

"Yes, of course. Why else would I have invited you?"

"And what about me?" asks Allan Quarterhour.

"You'll be force leader. You're a Warrior; that gives you certain privileges. Of rank, for instance."

"You want me to wear my Lieutenant's bar? That won't get me into half the Officers' Clubs around."

"Not a Lieutenant's bar. These." Ep pops open a black leather case. Inside is a set of Colonel's eagles.

"Do you know how illegal that is?"

"Surely no more illegal than piracy."

Allan thinks a moment. "What's the payoff?"

"Ten percent each."

"That comes to sixty percent for you," Carl mutters.

"Ten percent of how much?"

"My stolen goods were worth a million. I expect you to find at least five times that much loot at their base. So your shares come to five hundred thousand Credits. Each. Minimum."

"We'll do it," say all four at once.

Now, some explanations:

Epaimonidas the Trader doesn't exist. That is, he's not a player-character; instead he's being played, with appropriate hissings and rubbings of "webbed" fingers, by the Gamesmaster. His function is to bring the four new characters, Allan, Bea, Carl, and Dade, into the game world by giving them a specific task to complete—one that will leave them in a less precarious position than they now occupy.

Five hundred thousand credits is a lot of cash in game terms, but there are constraints on it. Carl needs practically the whole sum to pay off his ship. Dade will spend at least half of hers bribing the Master Thieves. As for Allan and Bea, who want experience, they have to hope there's a battle to win; this Gamesmaster uses a logarithmic (sliding) scale to award Experience Points for money won. A payoff of C 1000 would be worth 10 points, but C 500,000 is worth only 35.

The players are not worried about being led into a trap. If the party were more experienced, the GM might use an offer such as

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the Zu'ul's to trick them into an ambush; the Rasheni might be trying to provoke an interworld incident by capturing four Humans as "spies and provocateurs." But the Gamesmaster knows that the new characters have enough trouble ahead of them without needless complications; this offer is straight and he says so. (What he tells them is that Beatrice has used her father's intelligence network to check Ep's claims, and found them to be true.)

The party accepts an advance payment from Epaimonidas, uses it to purchase supplies, including weapons and fuel for Carl's ship. Ep also gives them a sealed navigation-tape (the GM hands them an envelope) with the coordinates of their target.

The four board *Lemminkainen*, lift from Castelnuovo's skyport, and play the tape. (Open the envelope and read:)

TARGET WORLD: Mardicinq (Human; Magic-positive)
TECHNOLOGICAL LEVEL: Early gunpowder
ENVIRONMENT: Quasi-medieval (Compacted)

The party members groan over that last word. A Compacted world (affectionately borrowed by the GM from Marion Zimmer Bradley's *Darkover* books) outlaws all weapons that throw projectiles: bows, guns, energy weapons.

§ *The game environment is usually liberally seasoned with borrowings from fiction: place-names, magical and scientific gadgets, and often even guest appearances by the characters (assigned Requisite values for the purpose).*

"Well," says Allan, "we're outlaws anyway. Carry the guns hidden and use them only if we have to."

Carl sets the controls on the K-Drive console.

CONFLICT: The Hand of Fate

All these happenings must be backed up by rules; by tables and charts, ratings and dierolls; quantifications of the variable world.

Carl Tanner's hand comes down on the drive lever—actually, Carl's player tells the Gamesmaster, "We're going now."

The GM picks up a sheet on which are recorded the values for various systems on the *Lemminkainen*, as well as a schematic diagram of the ship. He reads down to

K-Drive Reliability: 94

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And from there to

Months since Maintenance: 7

Each month Carl doesn't pay for basic maintenance (he's been short of cash lately) reliability of ship systems goes down 1%. 94 – 7 = 87. The probability that nothing will go wrong with the Drive this time is 87%. The GM rolls percentile dice, and a 62 comes up. "Drive successful," he says, and goes back to the ship chart:

General Reliability: 92

92 – 7 = 85%. The dieroll is 70, and nothing goes wrong. If the roll had been over 85, additional rolls would pinpoint the trouble: life support, computers, communications, and so on.

Note that each system could have been given a separate reliability number; this way takes less time, at least when failures are rare. Also, the probability of failure might have been checked instead of non-failure. The attempt would then have been to exceed rolls of 13% and 15% respectively.

Allan, wearing the phony Colonel's eagles, blusters at an orbital packet-monitor and gets permission to enter orbit around Mardicinq. His Ego of 12, plus 2 for the "disguise," totals 14; he rolls three dice, getting a 9, and passes with flying false colors.

"You're in orbit," the GM says. "Do you want to go down in a shuttle, or take the whole ship?"

Carl wants to leave *Lemminkainen* stashed safely in orbit. The others are less sure; the packet mounts a laser cannon that could help cover their escape. The shuttlecraft is unarmed.

Allan asks if he can use his persuasive powers on Carl.

"It's a three-die check if you want to try. If you fail, you automatically do it Carl's way." The GM looks at his watch. "You have to decide in exactly five minutes, or you miss your injection point."

§ *Disagreements among the players are permitted; the referee arbitrates them only by applying natural constraints such as time limits.*

Allan decides to try his winning personality on Carl. He rolls three 6-sided dice. Note that Bea and Dade could ask Allan not to try—since if he fails they're committed to the shuttle—but they could only force him by game means, such as the character of Dade

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knocking the character of Allan out cold.

Allan's dice come up all fives. 15 exceeds his Ego of 12. Grumbling (except for Carl) the adventurers board the shuttlecraft and head for glory.

Shuttle General Reliability: 95
Months since Maintenance: 30

95 – 30 = 65%. Carl bought his ship used, and he doesn't know that the shuttlecraft was not repaired at the ship's last tune-up.

§ *Many of the values in the game are not known, or not fully known, to the players: the old "we'll know what's faulty when it breaks" system.*

The GM rolls a 94, and something does break. Red lights flash in the shuttle, and Allan is relieved to note that everyone is now grumbling at Carl.

Dierolls identify the trouble: the main engines have flamed out. If Carl can't restart them, he will have to land the shuttle deadstick, with no guarantee that it will be able to take off again.

"Can I go back to the starship?"

Dieroll: elapsed flight time. "Too late."

Starquest measures mechanical aptitude by Intelligence and Dexterity. The GM rates restarting the engines as a 7-die test: Carl must roll seven dice, attempting to score lower than his combined Intelligence (10) and Dexterity (7).

Note the pattern of these checks. Allan's Ego test requires him to roll three dice and come up with a number no higher than his Ego Requisite number. Obviously, the higher the Requisite value, the easier the check is to pass; and the more check-dice thrown, the harder the test is.

The difficulty of such a roll can be measured by the ratio between the "average score" for the number of check-dice rolled and the number the character is attempting to beat. In this case, the average roll with three dice is 10.5—that is, half the time the dice will show ten or fewer spots. (It is, of course, impossible to actually roll half a spot.) Allan's Requisite score, the number he must roll equal to or less than, is 12. The ratio, then, is 10.5 to 12, or 0.875 to 1. The Gamesmaster rounds this number, multiplies it by 10, and calls it a *Difficulty Rating* of 9. (The actual probability of rolling 12 or less with three dice is 0.74, or about three chances in four.)

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Suppose Allan's Ego were only 7, the average roll with two dice. The ratio would then be 10.5 to 7, or 1.5 to 1, a Difficulty Rating of 15. (The probability of 7 or less with three dice is 0.16, about one chance in six.)

Carl's check involves seven dice, compared against two Abilities combined. The average roll with seven dice is 24.5 points. Compared to Carl's combined Intelligence and Dexterity, the ratio is 24.5:17, or 1.44:1. Rounding 1.44 and multiplying by 10 gives a Difficulty of 14. (The actual probability is—roughly—one in five. Calculations of probability involving lots of dice are a bit complex; there are 36 different numbers that can come up on seven dice, and $6^7 = 279{,}936$ ways the dice can roll—which is why this Gamesmaster uses the less-precise ratio and Rating system.)

Finally, suppose that Carl's Intelligence and Dexterity were only 3 points each, poor fellow. The ratio would be 24.5 to 6, or 4.08 to 1, the Difficulty 41 . . . but were that the case, the characters would be scrambling for crash cover right now, because Carl would be a long time rolling 6 points on seven dice. In this system, a Difficulty Rating of 35 means rolling all ones on the check-dice (for seven dice, that's a probability of 0.0000036, one chance in 279,936.) Anything more and you'd better forget the whole thing.

All of which is as it should be; what is easy for one person is difficult for another, and impossible for a third, dependent upon the abilities which game Requisites measure.

§ *There should be some system for a graduated challenge to abilities; not all situations are as tough as others.*

Looking back at the time the engines flamed out (his earlier roll) the GM determines that Carl will get two attempts to reignite, or three if he decides not to leave his seat and take cover against a crash.

First roll: 19. Close, but too high.

Second roll: 28. Carl is given five seconds to decide for or against a third attempt. He decides to stay at the controls.

Third roll: 15. Ignition! The landing is rough but not disastrous. At least, not yet.

They have landed right in the center of a Rasheni outpost. Wolf-faced sentries are snatching up their weapons and howling into communicators. One of the things Epaimonidas' money bought, however, was a jamming device.

"Is the jammer working?"

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"You see a Rashen throw down his radio and stomp on it."

§ *Whenever possible, the GM tells the players facts in the form of observations, which they then must interpret, rather than as Godlike statements.*

Dade asks if their delayed motor burn reduced the chances of their being seen.

The Gamesmaster thinks a moment. "Yes," he says, "but you don't know how much. You may have been reported as an explosion or fire on the ground."

§ *The players have the ability to insert their own suggestions and modifications, as long as the balance of the game is not upset. A good GM can think on his feet and never structures the game so tightly as to deny the players this freedom.*

The party is ready to open the hatch. Facing them are six confused, angry Rasheni with drawn swords. Allan has a sword out. Carl has a meter-long axe. Dade has a steel-cable bolas on her belt, and a sash with half a dozen daggers thrust in it. Beatrice is chanting, and her eyes have rolled up in her head; she is preparing to cast a spell.

The spell, if it works, will put all the Rasheni to sleep. It has several disadvantages: it will require her three full minutes to prepare, and it covers a limited area of ground. Any Rashen outside that area will be unaffected; any party members inside it will be. So they must wait.

While Beatrice chants, the GM rolls six dice. He has decided that each Rashen has one chance in six of leaving the sleep circle. One die comes up 1: one departs. The others are now exposed to the spell, and must check against their magical resistance (Ego).

§ *This particular kind of abilities check, not to perform a "feat" but to dodge some ill effect, is referred to as a "saving roll." Some games use extensive tables of saving rolls against specific effects such as spells, fire, and poisons. Objects may be assigned saves, such as a wooden wand's chance not to burn in a fireball.*

The GM examines a sheet listing the abilities of all the creatures played as characters or encountered by characters in the game (known generally as a "Monster Table," though not all the creatures

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on it may be monsters). The line he wants reads:

	STR	INT	DEX	EGO	COM	FER
Rasheni	3–18	2–12	1–11	4–14	7	8
	(11)	(7)	(6)	(9)		

The upper numbers indicate point ranges, and imply the dice thrown to find the number. Rasheni strength is found by rolling three six-sided dice, rather than the human two. Rasheni Dexterity is rolled on two six-sided dice, and one subtracted from the result.

The two last numbers are Commonness and Ferocity; not dice rolls, but rather indications on a scale of 1 to 9 of how widely found the creature is (7 here, fairly common) and how likely it is to attack on slight provocation (here 8, very likely).

By way of comparison, another line on the chart runs

	STR	INT	DEX	EGO	COM	FER
Humans	2–12	2–12	2–12	2–12	9	7
	(7)	(7)	(7)	(7)		

Finally, the parenthesized numbers are average values, which the GM may use if he does not want to roll a lot of dice for "bit players," who may not even need all the Requisite values. He uses these values here, and all the Rasheni get the standard Ego value of 9. He rolls five sets of saving rolls: 11, 7, 14, 8, 12.

Two Rasheni "make their saves"; the other three fall asleep. The fight is now three on three; rather better odds.

Beatrice notes on her character card that she has successfully cast a spell, which is worth five Experience Points.

The hatch cycles, the intrepid three venture forth (Bea will be incapacitated for another five minutes) and the battle is joined.

"Do we have surprise?" Allan asks.

"You do."

The Rasheni have been unsettled first by the sudden intrusion and second by the blackout of half their number. Because of this, Allan and his friends can each strike the first blow in their combats.

Dade throws her bolas. Her Dexterity is 11: ordinarily she would need to roll that or less on three dice. In addition, since the bolas covers a large area (four feet across) it receives a "to-hit" modifier of + 1. 11 + 1 = 12. However, a Combat Table notes:

RUNNING TARGET: –2

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and the Rashen is certainly running. So the actual "To-Hit Number" is 11 + 1 - 2 = 10.

Dade rolls a 9. The bolas winds round the Rashen's legs, and he falls.

Carl swings his axe. His Dexterity of 7 is not modified; he is in close combat (called Melee) and his target's movement does not matter. He rolls a 3, the smallest possible number. This means he has done more than hit; he has scored a "Critical Hit," an exceptionally severe wound.

The GM rolls dice, checks a table. Carl's blow, it seems, has crushed the Rashen's skull outright; the alien drops instantly dead.

Allan strikes. He is also in Melee; his 8 Dexterity is also not modified. He rolls a 7; a hit. Now he checks for damage inflicted. His broadsword is rated at "1 + 1", so he rolls one die and adds a point. The roll is 4, the total 5. Five is then subtracted from the Strength of the Rashen; 11 – 5 = 6. The Rashen is far from dead.

§ *Some system of "hit points," "damage factors," or the like is used to keep track of progressive damage to a character. When sufficient "wounds" are absorbed, the character "dies." Points can be healed through time, medicine, and magic. Powerful magic may even restore dead characters to life.*

The alien swings his sword now. The GM rolls, and the blow strikes Allan, not critically. The Rashen sword has a damage rating of 1. The GM rolls a 2, and Allan loses Strength. He has 8 points left; he's doing better than his opponent, but they're not yet to the Rasheni stronghold, where who knows how many foes await. . . .

PLOT: The Concept of Campaign

If the adventure game seems like a "continual crapshoot," it is because the need to show how the game *functions* has gotten in the way of showing how the game *feels*. The skeleton has been displayed without the flesh clothing it. In actual play, the *storyline* occupies the interest, and the dierolls flow by, no more noticed than the phrase "he said" is noticed in fictional dialogue.

The memories one carries away from the game are of its events, not its mechanics. . . .

For those of you who are wondering what happened to Allan Quartherhour and Company, fear not. After defeating the Rasheni guards, they bound Allan's wound and used the guards' passkeys (and Dade's Dexterity) to get inside the pirate stronghold.

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It was a great, dimly lit cavern, piled high with the kinds of things that pirates hijack: atomic disintegrators, gravity generators, quantum black holes crated for shipping. And half a dozen hijacked freighters, all in a line.

They found a lone Rashen asleep, and woke him up rather roughly. Allan used his persuasive powers—which worked this time—and the alien helped them find old Epaimonidas's ship, shovel it full of loot, and escape, blasting down the hangar door with an atomic disintegrator. As the five adventurers flew full-throttle toward the sky, Bea created a dust storm behind them that kept the raiders from pursuing.

And back on Castelnuovo, Epaimonidas was so pleased at the return of his ship that he gave the party an extra 10% for their Rashen ally, Farrnigrarr (but call him Fang). And Carl said, "Do you all remember when you promised me a tenth each of yours if I could fly you all out in one piece?" Despite a case of sudden mass amnesia, Carl wound up with 14% anyway.

Ep disappeared, then, with a promise to recommend the company to his friends.

Then Carl said, "Now that the ship's all mine, I can have some *real* adventures."

And Bea said, "There have been three assassinations since I've been gone, and four births in the royal family. That makes me thirty-fifth in line for the throne. I think I've got some time to kill."

And Fang said, "I sure can't go back to my Packbrothers now."

And Allan said, "Who wants to be a Lieutenant?"

And Dade said, "Give me two weeks to bribe the Guild examiners before you do anything."

"Pardon me," said the Gamesmaster, affecting a Gaean accent, "but your services were recommended to me by a mutual friend . . ."

And off they go again.

This whole adventure might have taken a weekend afternoon and evening to play out, counting time to create characters. ("Rolling up" characters is the prevalent phrase.) But the game does not end when the adventure ends. Stored on cards between sessions, the characters return at the next evening together to earn more Experience; improve their abilities; and grow famous or infamous, powerful or notorious in the game world. Some will "die," to return as entirely new characters—or even their own avenging relatives.

Numberless games of bridge are played in the world among groups of people who consider it a "social activity." No one is suggesting that rôle-play games will replace contract bridge. But with the frac-

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tion of the population that prefers group interaction to taking diamond tricks, that wants to share an *experience* rather than idle cardtable conversation, the games are taking hold.

There are no physical barriers whatsoever. The author knows of handicapped, deaf, even blind players. Since the action is in the mind, any sort of communication will do. The financial investment required is a few dollars for a set of rules, pencils, and paper. The most elusive and precious commodity involved, in fact, is someone with the time and creativity to be a Gamesmaster; and more and more play-aids—castles prestocked with monsters, maps of dragon-haunted landscapes and the spaces between stars—are available to make his job easier.

In an important way this piece has been a foredoomed exercise. No article of the length allowed to me can teach you to play games, or more than suggest the incredible variety and richness of living out a well-plotted story. (Notice that there were no dungeons here, nor any dragons, and hardly any magic; but *next* week, when Beatrice's powers have increased . . .) The only way to find out for real is to play for real. Hesitant adventures are better than no adventures. And that dreamy member of the circle who hates bridge just might be an outstanding Gamesmaster.

You've read this far; the next step isn't such a large one. For the Road, as Professor Tolkien said, Goes Ever On. . . .

RÔLE-PLAYING GAME PUBLISHERS

While no list such as this can hope to be complete or up-to-the-minute, the following are the most widely available and commonly played RP games. Also see the advertisements elsewhere in this magazine. (And when writing, please mention where you heard about them.)

Fantasy Games Unlimited
Box 182, Roslyn NY 11576
Fantasy: *Archworld, Chivalry & Sorcery, Bunnies and Burrows* (inspired by *Watership Down*—honest!)

Flying Buffalo Incorporated
Box 1467, Scottsdale AZ 85252
Fantasy: *Tunnels & Trolls*
SF: *Starfaring*

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Game Designer's Workshop
203 North St., Normal IL 62525
SF: *Traveller*

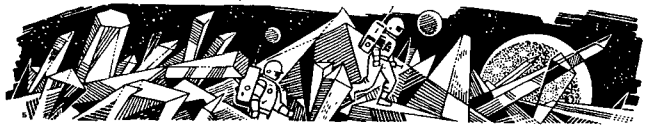
Heritage Models, Inc.
9840 Monroe Drive, Bldg. # 106, Dallas TX 75220
Fantasy: *The Emerald Tablet*
SF: *John Carter of Mars, Star Trek*

Lou Zocchi and Associates
1513 Newton, Biloxi MS 39532
Fantasy: *Superhero 2044*
SF: *Nuclear Survivors, Space Patrol*

Metagaming
Box 15346, Austin TX 78761
Fantasy: *The Fantasy Trip, Melee, Wizard*

TSR Games
Box 756, Lake Geneva WI 53147
Fantasy: *Dungeons and Dragons, Empire of the Petal Throne*
SF: *Gamma World, Metamorphosis: Alpha*

Also worthy of mention is: Judges' Guild, Box 773, Decatur IL 62525, who publish a large number of play-aids for *Dungeons & Dragons*. Metagaming and TSR Games publish magazines (*The Space Gamer* and *The Dragon* respectively) that contain articles of interest. Finally, Lee Gold, 2471 Oak Street, Santa Monica CA 90405, issues an enormous fan magazine, *Alarums and Excursions*, patterned after the SF-fannish Amateur Press Associations.



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ANSWER TO TANYA TACKLES TOPOLOGY (from page 61)

Observe that the figure has five compartments. If there is a solution, the twisty line that enters a compartment from the outside, then leaves the compartment, must cross two line segments—one while entering, one while leaving. If the compartment is surrounded by four line segments, as in the case of compartments A and B, the line can enter and leave the compartment twice. However, if a compartment is surrounded by five line segments, all five can be crossed only if the line has one of its ends *inside* the compartment.

Three compartments (C, D and E) are each surrounded by five line segments. Therefore, if the puzzle is solvable, each of these compartments must contain one end of the twisty line. But a line has only two ends. Therefore there is no way to solve the puzzle without leaving at least one line segment uncrossed.

Couth left his daughter alone to work on the proof, then returned later to see if she had found it. To his surprise, Tanya not only had thought of the proof—she also had found a fallacy in it! In fact, she had discovered a way to solve the original problem!

How did Tanya solve it? See page 88 for her solution.

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United Cerebral Palsy

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RAINBOW BRIDGES

An environmentally enlightened engineer decides
that all riverways, canyons, crevices, and valleys
are to be bridged by rainbows.

A rainbow bridge
is a more natural and esthetic way
to connect two separate land masses.

This evanescent design was chosen
because of its imperviousness
to wind, storm, and flying creatures.

The lightweight and immaterial bridges
will be planned to hold seven lanes of traffic.
Red, orange, and yellow will be restricted
to high-speed commercial vehicles.
Green, blue, and violet will be designated
for passenger cars.
While indigo will be reserved for pedestrians,
bicyclists, and runners.

Handrails and flashing lights will be added
to assure the safety
of those on foot.

It is hoped the faint glow of the roadway itself
will ease drivers' eyestrain.

Until engineers can perfect a practical
nighttime model,
the rainbow bridges will be operational
only on sunny days.

—Peter Payack

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. . . AND SETTLE DOWN WITH A GOOD BOOK

by Dian Girard

art: Alex Schomburg

The author is relatively new to SF writing; her first professional sale, to an anthology, appeared in 1974. In the past, she's made wigs, done technical writing and drafting, and slung hash for a living; she now tests computer software for a local computer service bureau. She has been active in the SF convention circuit for many years and claims she owes her start in SF to her father's collection of old Amazings. *She is 36 and lives in Los Angeles with a husband, a rambling 1911 house, and three mini computers. If we refer to her as "Ms.", she threatens, she won't speak to us for months.*

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It was noon over Cincinatti. Not that anyone noticed, particularly. The low, squat dome that covered the city muted the light or augmented it as required, and almost no one lived on the surface anyway. Several hundred feet below the surface, on Residential Level D, the corridor lighting was the color of early morning, and synthetic birds twittered in non-existent trees. There was a carefully balanced amount of humidity in the air; and whether the world above was clear or cloudy, raining or blazing hot, was not only a mystery to the inhabitants but a matter of supreme indifference.

Cheryl Harbottle, who lived in apartment 1743, D Level, had a fancy for some nice gloomy weather. The children were off at school, her husband would be at his office until three, and she felt like pampering herself. She strolled over to one of the six large Vista-Vues in the living room and peered at it. What a shame you couldn't really look out of the things. They had a sort of misty look to them, kind of like the translucent glass people used to put in bathrooms, and a random colored pattern that looked like a blue sky and grassy lawn. If you had a good imagination, that is.

She touched the control monitor and the warm golden glow dimmed down to a cool bluish light. That was better! Now for a little verisimilitude. Environmental sound was one of the optional extras that came with the computer link. She flicked on the screen, tabbed for the catalog, and punched in R21—Rain, Medium, Intermittent.

It was going to be a great afternoon. She sank down on the couch, holding her cup of Robo-Chef coffee with a delicate hand, and listened to the irregular plink . . . plink . . . patter of the rain. Cheryl sighed contentedly. Now all she needed was a good book.

She turned on the computer link again and punched for the book catalog, knitting her brows in concentration as the titles rolled by. Aha! *The Encyclopedia Murders*. That sounded like the very thing. It was a pity you couldn't get real books anymore; the kind that were all sewn together. It must have been very nice, she thought, to just sit and turn the pages instead of having to pick them out of the printer and jam them down into the recycle unit. Oh well, that was progress for you.

Cheryl had just punched in the beginning of the code when the control unit jammed. Drat! She rattled the button with an irate forefinger. The idiot thing was stuck in the down position and wouldn't come up. She tried to get her fingernails around the edge of it, but stopped when it looked like she was going to break a

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nail. Humph. Cheryl brushed back her curly red hair and glared at the unit.

That was the trouble with modern living. When things went wrong there was no way to fix them. She went into the bathroom and opened a few drawers. No safety pins, hairpins, or paperclips. Not even a nail file left lying around. Her Handi-Mani nail-beautiful machine automatically shaped, decuticled, and colored her nails. Dammit! She had a sudden nostalgic longing for the good old cluttered days of life. Her mother must have had absolute *drawers* of old junk that could be used for prying up one stupid button. Cheryl slammed a cupboard shut and went into the bedroom.

It was as immaculate as the bathroom and living room. No luck. She went into the twins' room. Surely two messy, self-centered pre-teens would have lots of awful rubbish hidden away. She glanced around hopefully. Well, it wasn't on the floor. The automatic Sweep-Kleen had been through the room punctually at ten, and there wasn't even a speck of dust in sight.

Suddenly Cheryl had a mental image of a long sharp-pointed thing. It had come with some sort of science kit. Now which of the kids had gotten that? She began to root through drawers. It must have been Linda. Ha! She came up with a brightly colored plastic box with rounded corners. Snapping it open she found a miniature microscope (made of unbreakable purple plastic), four Real Specimen slides (mounted in bilious green plastic squares), and the long sharp-pointed thing. It was labeled Micro-Probe. She seized it triumphantly and flicked it with her finger. The bright blue material stood staunchly.

Back in the living room Cheryl pried at the reluctant button. Outside the rain pattered down drearily, monotonously; and the room was a cheerless gray. She managed to wedge the plastic in between the button and its housing and began to pry. With a sudden SNAP! the Micro-Probe broke and her hand hit the print control.

After a moment's hesitation vast quantities of paper began to come out of the printer slot. She grabbed at the control panel. It was still jammed—this time in the ON position. The offending button was now securely up, and a small piece of blue plastic under it was keeping it that way. There was no way she could call Repair; it was part of the computer link. Just like that damned monotonous rainstorm.

Cheryl tried to pull the chunk of plastic out, but she couldn't

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even get a good grip on it. Prying with the blunted part of the Probe only seemed to wedge it tighter in place. The living room was now mostly obscured by large sheets of print-out. Tweezers, she thought frantically. No, no tweezers. She hadn't even seen a pair in years. Pliers? No, no pliers either.

She sat down heavily on the paper-covered carpet and stared dismally at the printer. It was throwing out sheets almost as fast as she could count. Naturally. The printer was still on FAST for the morning paper. Well, it could be worse. She had a mental image of the Robo-Chef going mad and herself wading ankle deep in cheese fondue.

Suddenly Cheryl brightened. Of course! When it was done with the last page it would stop. She relaxed, leaned back on her arms, and stared benignly at the hard-working printer. The sheets, flipped up into the air by the ejector, were being caught by the air conditioning and wafted gently around the room. They settled softly on the couch, the coffee table, and practically every horizontal surface—like some sort of oversized snowflakes.

She'd have to sort the pages, of course, but she'd have the book all at once, just like it should be. Getting up on her knees Cheryl crawled over to the printer and began rooting through the sheets. How long were murder mysteries? Hmmm. Say about 300 pages. That would be 600 sheets, since the machine only printed on one side. Well, that would be quite a bundle to hold on your lap. Probably be better to sit them on the coffee table or something.

Finally locating Page One, she rocked back on her heels and scanned it. Overhead the printer was wisking out more sheets with a satisfied *shissssh*! The page in her hand was headed **A**. A few lines further down it said **Aachen**. Cheryl stared at it unbelievingly and grabbed for another. **Abiathar**, it said half way down the page. She hadn't finished punching in the code, she remembered now, with growing horror. She'd just started to key in the code when the button jammed. Damn, damn, damn. **Agricola, Gnaeus Julius** settled on her lap and she wondered vaguely which encyclopedia she'd gotten.

Frustration and self-pity grappled with her self control. For the moment sanity held. "We are the masters," she said aloud, very firmly. "We are the masters and the machines are the servants. It's all a matter of superior intelligence."

Cheryl stretched out her legs, causing a minor local flurry in the increasing blizzard of paper, and tried to apply herself to the problem. She couldn't use the control panel to call Repair because

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the controls were interlocked, and therefore she would have to unstick the button first. But if she did manage to unstick the button she wouldn't *need* Repair anymore. It was all very clear.

Actually, now that she thought about it, she never called Repair herself anyway. When something went wrong the machine stopped and placed its own trouble call. Why not this time? Of course. From the viewpoint of the computer nothing was wrong. It thought Cheryl still had her finger on the button and was ready for the next page. She rubbed her hands together fiendishly. Now, if she could really manage to break something . . .

She jumped to her feet and stalked the control unit. Except for a few buttons, including the jammed code key, everything was covered with a transparent Saf-Tee shield, guaranteed to be unbreakable. A few test thumps convinced her that this claim, while perhaps a bit presumptuous, was probably more true of the plastic than her knuckles. She tried hitting it with the heel of her shoe, but that just bounced.

Reflecting that a device with moving parts ought to have some sort of Achilles' heel, Cheryl eyed the over-industrious printer. The mechanism was recessed into the wall, but nothing with an exit slot can be completely sealed up. She glowered at it. The paper slot was barely wide enough for a piece of paper to come through, and an ornamental deflector kept her from blocking it off with her hands or anything else. There was no way she could get at the internal mechanism; all that was serviced from a maintenance corridor on the other side of the wall. For one mad moment she wondered where she might be able to steal a fire axe and smash the damned thing.

Swearing softly to herself, Cheryl grabbed a handful of pages and stuffed them down the recycle chute. Practically everything in the room was obscured with paper, and some pages were starting to float into the other rooms. She grabbed faster. Grabbing with one hand and stuffing with the other she was still not even close to the speed of the printer. Besides, it had a head start. The paper was stacked in drifts now, great white heaps that settled complacently against the walls and furniture.

Cheryl threw her last handful down on the floor and wiped her hands off on her hips. She got to her feet, looked at the printer for a long moment, and then kicked her way across the floor and into the bedroom. She put on her new fall coat and the cute hat Logan had bought for her birthday. She had been meaning to look in on that art exhibit up on First Level, and she really ought to buy

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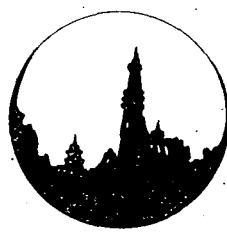
Logan some new shirts. The kids could all use new underwear too.

She walked back through the living room, kicking her way through the drifts of paper. **Bandicoot** settled down on her left shoulder and then slipped sideways to the floor. She opened the door to the corridor and gave a last look at the rapidly filling room.

Cheryl shut the door quietly but firmly. Behind her the *whissssh* of the printer mingled with the quiet patter of the rain.



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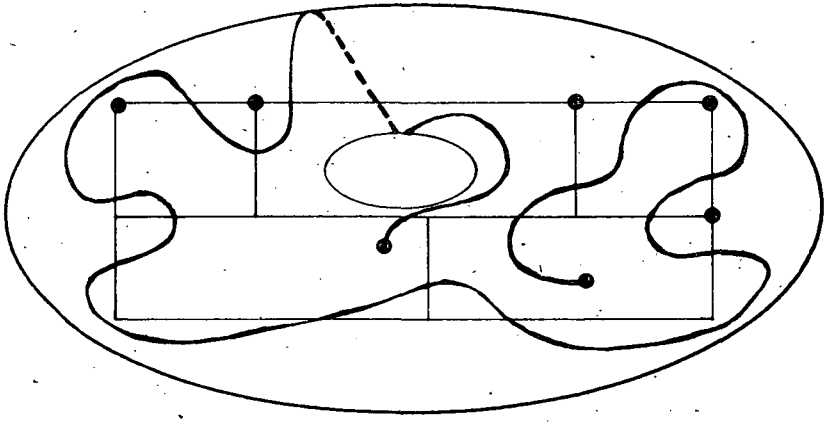
SECOND ANSWER TO TANYA TACKLES TOPOLOGY
(from page 80)

Couth had forgotten to make clear that the impossibility proof assumes that the figure is drawn on a plane. Tanya, who had a high I.Q. for mathematics, realized that the proof fails if the figure is drawn on the surface of a torus (the surface of a doughnut or bagel) in such a way that the hole in the torus is inside one of the compartments surrounded by five line segments. For example, if the figure is chalked inside the Bagel as shown below, it is solved easily:



Couth was delighted by his daughter's insight. He then gave her another problem which she solved quickly.

"Suppose," said Couth, "our spaceship were a sphere instead of a torus. Can the figure be drawn on the inside of a sphere in such a way that the original problem can be solved?"

See page 133 for the answer.

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THE INITIATION

BY Mark Ringdalh

art: Jack Gaughan

Mr. Ringdalh is one of the small covey of SF writers who live in Maine.

Dino Gitaglia wiped the bead of perspiration from his upper lip, then looked nervously at the *soldato,* DiPalermo, standing at his side.

DiPalermo returned the look, then let his swarthy, scarred face break into a broad grin. "Hey, *compagno,* don't worry." He nodded toward the hand-carved double doors. "You'll do fine in there." They stood in silence for a few moments, then DiPalermo sighed, shrugged, and laughed. "What do you think of the Yorkers this season?"

Dino Gitaglia shook his head. "I don't follow the Yorkers." He smiled. "Put me down for the Yankees."

DiPalermo nodded. "Good. The Chief will like that. Respect for tradition."

"Checking up on me?"

DiPalermo shrugged, then patted Gitaglia on the shoulder.

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"Just asking. How do you think the Yankees will do in twenty-fourteen?"

Gitaglia shurgged. "Who knows? It was a dumb move trading Vitelli."

The double doors opened, and the one called "the Irishman" leaned through and looked at Gitaglia. Then he looked at DiPalermo and cocked his head toward the open door. DiPalermo took his companion by the elbow and steered him toward the door. "This is it, *compagno*. Just stay cool."

As Gitaglia entered and was ushered to a chair against the wall, he looked at the faces seated behind the grand banquet table. He recognized Johnny "Three Fingers" Provacci, Frank Manterro, and Joey Capuzzi. Seated in the center was Don Salvatore "The Chief" Callace. Don Salvatore nodded in his direction, and Dino nodded back.

The Chief pushed himself to his feet and held out his arms for quiet. Instantly the room hushed. Don Salvatore lowered his arms, pulled the stub of a cigar from his mouth and dropped it into an ashtray. Grasping a coat lapel with each manicured hand, The Chief looked from one end of the banquet table to the other, then turned his eyes toward the antique cut-glass chandelier.

"This is a time of war, so I will make this short." The Chief looked down at Dino seated against the opposite wall, then held out a hand in his direction. "Look at this fine boy . . . and the other side says we are *finished*!" Don Salvatore smiled as those seated around the table laughed and applauded. They became quiet, and The Chief nodded. "Finished. Well, we almost *were* finished." He pointed around the table. "Ask Johnny there, or Frank. They remember the days when it was worth a good man's life to join." The Chief nodded. "No money, frozen out, everyone's hand turned against us, all the families at each other's throats. I can admit it now; they almost had us back in Ninety-Eight. Remember Frank?"

The one called Frank Manterro nodded. "Who could forget, *padrone*?"

Don Salvatore nodded, then made a fist and slammed it down on the table. "We lost many good friends and brothers to the . . . *maiali*!" He pointed around the table. "But, here we still are! And soon we go to the mattresses and hit them," he punched a fist into his open hand, "hard!" The Chief nodded at Dino and motioned with his hand. Dino Gitaglia stood, walked to the table, and stood across it from Don Salvatore. "Boys, this is Dino Gitag-

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lia. He comes on Vincente DiPalermo's recommendation." The Chief studied Dino, then turned and looked at those seated at the table. "I look at this boy, and I think. We have done many things—adopted from the other side many ways—just to survive." Don Salvatore looked at Dino and smiled with a look of fierce pride. "Many said that we would *never* survive, no matter *what* we did." He nodded and held out a hand toward Dino. "But, *look*! Look at Dino Gitaglia, and tell me such as this swears his life and soul to a dying organization!"

The Chief motioned to one side and "The Irishman" walked up and placed a gun and a knife on the table between Dino and Don Salvatore, then withdrew. "Dino Gitaglia, this represents that you live by the gun and the knife," he held out his fist, "*and* that you *die* by the gun and the knife! *Comprende lei*?"

Dino nodded, "*È inteso, padrone.*"

"Cup your hands." Dino put his hands together and held them over the weapons. The Chief crumpled up a sheet of paper, placed it into Dino's cupped hands, then struck a match and ignited the paper. "Say this: this is the way I will burn if I ever betray our secret."

Dino looked up from the burning paper with unblinking eyes. "This is the way I shall burn if I ever betray our secret."

The flame died and The Chief nodded. "Never forget what I now tell you. Burn it into your mind. Betraying our secret means death without trial. Violating any member's wife means death without trial. Look at them, admire them, and *behave* with them." Don Salvatore held up his hands. "Everybody up, and throw a finger from one to five."

Everyone stood and held out one hand, either as a fist, or with one or more fingers outstretched. The Chief counted up the total, then began counting from the left end of the table, stopping on Johnny "Three Fingers" Provacci. Don Salvatore turned toward Dino. "Well, Dino, that's your *gombah*—responsible for you as your godfather."

Johnny Provacci laughed, stood up, and walked around the table, stopping in front of Dino. Provacci held out his hand. "Give me the finger you shoot with."

Dino held out his right index finger. Provacci pricked it with a pin and squeezed it until the blood ran. Don Salvatore spoke. "This blood means that we are now one Family." The others, seated at the table, stood and applauded. "The Irishman" reached out and handed a small leather case to The Chief. Don Salvatore

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opened it and pinned the badge on Dino's left shirt pocket. "Welcome to the ranks of the finest, Dino Gitaglia. Welcome to the New York City Police Department."

WELL, IT WASN'T FORBIDDEN PLANET, BUT . . .

Neil Armstrong once thrilled the whole nation
With flicks of his Lunar vacation;
  As SF films go,
  Not much of a show,
But it *was* the first made on location!

—Dan J. Hicks

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ON COSMOLOGY

by Tony Rothman & L. C. Shepley

Tony Rothman graduated from Swarthmore College in 1975, L. C. Shepley in 1961, both with degrees in physics. Rothman currently pursues a PhD in physics at the University of Texas at Austin, plays the oboe, and studies Russian. Shepley, with a PhD from Princeton, is an associate professor of physics at the University of Texas at Austin and is associate director of the Center for Relativity there. He also plays the flute and the organ, but not at the same time. Rothman is the author of the SF novel, The World Is Round, *published by Ballantine/Del Rey; Shepley is co-author of* Homogenous Relativistic Cosmologies, *published by the Princeton University Press.*

Relativity theory is currently receiving a good press. The public, as well as we relativists, has been captivated by the charms of quasars, pulsars, black holes, expanding and collapsing universes. The excitement dispersed by our popularizers would have the layman believe that we have succeeded in sewing up the universe, with perhaps a minor loose thread here and there.

The outlook from the center of the known universe, that is, from the Center for Relativity Theory in Austin, Texas, is slightly less complacent, although not less enthusiastic. Non-specialists are often unaware that cosmology theory is currently in a dilemma, whose resolution is not yet known. The Big Bang model of the universe, which has become known as "the standard model," explains the general features of the universe fairly well. However, it fails to explain several details, for example galaxy formation, and has the fundamental problem that the Big Bang itself is a physical impossibility. Alternative models, which attempt full consistency, as well as the explanation of several features the standard model leaves out, fail on both counts: that is, they are not self consistent and do not explain the real world any more

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fully. Much of the work in current cosmology theory is, in fact, devoted to exploring non-standard models, which often produce features so bizarre that one may be left wondering if current-day physics has anything to do with reality at all.

We would like to take the reader one step beyond the popularly known Big Bang model and explore some of these non-standard models. One of us believes this exploration to be physically relevant, and the other has not yet made up his mind. We leave it to the reader to decide whether we and other relativists have gone off the deep end.

To start the discussion, consider cosmology, the study of the structure of the universe. All experimental evidence to date indicates that the universe is highly **isotropic:** *The visible universe has the same properties in all directions.* (The reader is advised to memorize the preceding sentence.) For instance, antennas receiving the one-centimeter wavelength radiation from space record the same amount of flux no matter in which direction they point. Flux is simply defined as the amount of energy from a source received by a square centimeter of antenna during one second. If you think of grass as an antenna, it receives a certain amount of energy from the sun over each square centimeter each second. This is the solar flux. So it is with the universe. All of space is permeated with radiation, the so-called cosmic black body radiation. It is now known that this radiation must come from the very early stages of the universe, just one hundred thousand years after the apparent time of the Big Bang. The flux of this radiation is extraordinarily isotropic; it is exactly the same in all directions, to one part in 10^4.

The reader might ask whether the fact that galaxies are irregularly lumped in clusters means the universe is not isotropic. After all, the earth does not have the same physical properties in all directions (mountains here, valleys there, oceans everywhere) and is therefore non-isotropic. The problem here lies in not looking on a large enough scale. On a scale the size of the universe, the clustering of galaxies disappears and matter is evenly spread, just as the earth looks like a smooth ball when viewed from a large enough distance. Direct astronomical observation shows this isotropy, but there is also indirect evidence: The abundance of the isotope deuterium is more than can be produced in a non-isotropic universe. Yes, on the large scale, the universe is strikingly regular, even monotonous. This isotropy is the reason we have adopted as the "standard" model of cosmology an isotropic volume of gas

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expanding since the Big Bang 10^{10} years ago, gradually cooling and condensing into galaxies, stars, and us.

The most common conception of cosmology is the detailed study of physics within a realistic model of the universe, and most people conceive this model to be the standard model. However, as we have mentioned, relativists spend ninety percent of their time studying imagined universes which are clearly non-realistic. We are accustomed to view physics, including cosmology, as the study of a real world, an investigation of the laws of nature. A legitimate question to ask is why we study such unnatural cosmologies as the causality breaking Taub-NUT model, the empty Kasner model, the non-expanding Gödel model, not to mention the nine Bianchi classes, many of which aren't even approximately isotropic and have other weird properties as well. At first glance, these models seem to bear absolutely no relationship to nature. After all, we don't see causality breaking in the real world; the universe is not empty; the universe is expanding; and the universe is highly isotropic.

A legitimate answer to this question might be the following: The above models and other non-isotropic models (or *anisotropic* models, as they are called in the trade) are investigated, not only because the universe may have been anisotropic at one time, but also because it is important to know how the universe is *not* constructed in order to understand the way it *is* constructed. The reader should be aware that even the "standard" isotropic Big Bang model discussed earlier was originally rejected by Einstein because it portrayed the universe as expanding. Einstein's biggest mistake was his assumption that he knew *a priori* what the universe was like and that that universe was static. Had he investigated expanding models, the world would have been better prepared for Hubble's discovery that the universe *was* expanding.

A question still remains, however, concerning what are legitimate models for study. A scientific model is a construct, an application of a general physical law to a specific circumstance. We take the laws as initial assumptions. Then, perhaps, we add some additional constraints, such as in cosmology the assumption of isotropy. We construct a model based on these assumptions and compare it with reality—assuming our conception of reality means anything. This comparison is the way a scientific theory is tested, and the theory stands or falls on the results of the tests. The question is: How many features of the "real world" should a model attempt to mimic? For instance, what does a model of an

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empty universe, like the Taub-NUT model (which we will be using as an example) tell us about the way the real universe is or is not constructed? The real universe is, after all, self-evidently non-empty. What does an empty model tell us that isn't obviously nonsensical?

In answering this question, we first make the observation that the real universe *is* empty, or almost. The average matter density of the universe is about 10^{-30} grams per cubic centimeter, the equivalent of one hydrogen atom per cubic meter. Yet, in an isotropic model, one supposedly patterned after the real world, it is only the effect of the matter which governs the expansion. (That is, the gravity caused by the matter in the universe is the only thing which determines how fast the universe expands.) This tiny fraction of matter in otherwise empty space is responsible for the behavior of the entire model back to the very instant of the Big Bang itself. This sole dependence on matter would not necessarily be bad if the model behaved properly but, unfortunately, it doesn't. The Big Bang, where the model starts, is supposedly an infinitely dense event, a point at which all the matter in the universe is located. This infinitely dense state is a singularity of the model, a breakdown in the sense that the model can't describe reality before that point. We would like to remedy this situation. To show how a totally empty universe fits in, we must first look at anisotropic models in general.

Anisotropic models were originally studied in the hope that the singularity just spoken of might be avoided. To understand this hope, see Figure 1, in which we represent the universe as a cloud of dust particles collapsing under the influence of its own gravity. Now, a collection of particles which collapses perfectly isotropically, as in Figure 1a, will meet at an infinitely dense point, from which it cannot emerge. On the other hand, one would think that even a slight amount of anisotropy will allow the particles to miss each other, so the picture can be continued to describe the reexpansion. We show this behavior in Figure 1b. This "near miss and reexpansion" is one way of viewing the Big Bang, an expansion following a previous collapse, or just a collapse in reverse.

In an anisotropic model, pure geometry plays a role, not just matter. In fact, in a model which has matter and is even slightly anisotropic, the effect of pure geometry eventually dominates as we go back to the starting time of the model. The following model may portray the universe very well: matter most important when the universe is expanded and isotropic; geometry most important

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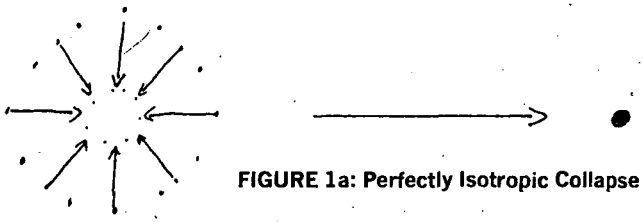

FIGURE 1a: Perfectly Isotropic Collapse

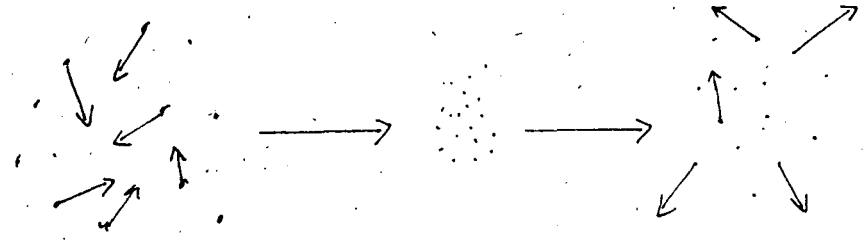

FIGURE 1b: Anisotropic Collapse and Reexpansion

near the Big Bang, if the universe turns out to be anisotropic there. Thus, an empty model, one which is pure geometry, might be a good way to describe the early universe. Actually, the hopes for a non-singular model proved futile; even an anisotropic model has a singularity, a point which will be explained later.

At this moment, the confused reader is likely to be screaming, "What is all this nonsense about 'pure geometry'? Do you mean 'pure vacuum'?" No, no, not vacuum. In order to begin to get some intuition about our use of the term "pure geometry," refer to Figure 2. In the top figure we've drawn a universe expanding isotropically in all directions. As this "rubber sheet" model of the universe expands, the dots, which are smoothly spread on the average, get farther apart. In the bottom figure, we've drawn little lumps of curved geometry. They are similar to lumps of matter in that they have gravitational fields like matter and therefore affect the overall rate of expansion. We will go into details below, but the important point to keep in mind for now is that, in General Relativity, such curvature of geometry is the source of a gravitational field in exactly the same way that matter is the source of a gravitational field. In fact, this is the explanation of

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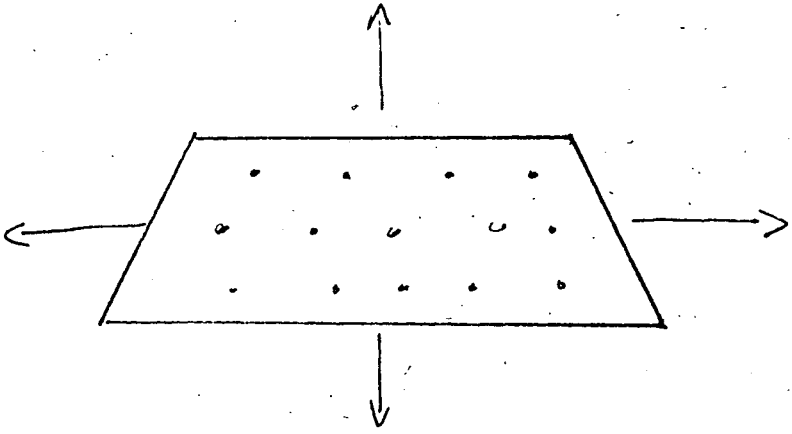
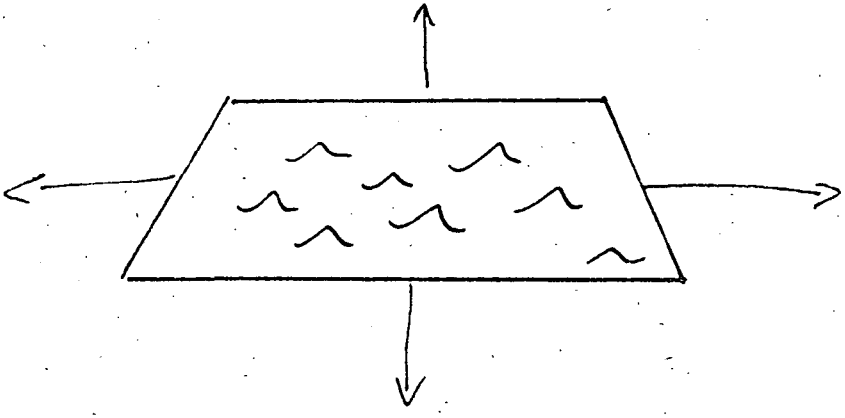


ISOTROPIC EXPANSION



"LITTLE LUMPS OF CURVED GEOMETRY"

FIGURE 2.

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why anisotropic models, unfortunately, possess a singularity. Consider again Figure 1 with its collapsing cloud of particles representing the universe. The collapse drawn in Figure 1b is anisotropic and thus has associated with it "little lumps of curved geometry." These lumps, as just mentioned, produce their own gravity, more than would exist in the isotropic case. Thus, an anisotropic universe is actually pulled into a singularity faster than it would be if the anisotropy were absent. Thinking in reverse, it is then impossible to continue the reexpansion, or Big Bang, as we originally drew in Figure 1b.

Now it is time to make these notions a bit more precise. For those of you who have heard that the presence of matter curves space, it might come as a surprise to know that space can be curved without matter. More properly, it is *spacetime* that is curved. Spacetime is the collection of all physical locations where events can occur. Since each event must be specified by its three coordinates of position and by its time, spacetime is four dimensional. Spacetime has replaced the outmoded concept of two separate entities, "space" and "time", because they are now known to be inseparable. To see how spacetime can be curved without matter, we first examine the ordinary matter-induced curvature of spacetime.

Matter, by its presence, curves spacetime and therefore affects the local geometry. Other matter attempts to move along the straightest possible path it can, but this path itself is affected by the spacetime geometry produced by the first piece of matter and by all the other matter in the universe. See Figure 3. In the absence of matter, spacetime is flat and particles move in straight lines. That is, they move forward in time linearly and they move forward in space linearly. Where matter causes curvature in the geometry, a particle moves along what is called a geodesic, the straightest path allowed. Think of the sun causing curvature, changing a flat geometry to a curved one. The earth, moving around the sun in a spatial ellipse combined with its motion forward in time, traces out a helix in spacetime. The helix is the straightest possible path allowed by the curvature. Farther away from the sun, Mars traces a more stretched-out helix because the effect of the sun on the curvature is less.

The bothersome question is, how can spacetime be curved without the sun, or without the presence of other matter? An empty spacetime should be flat. Yet, we've been talking about curved spacetime in the Taub-NUT model which we also said is empty.

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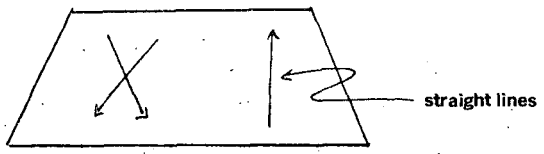
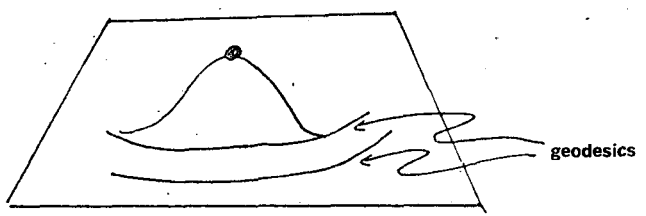
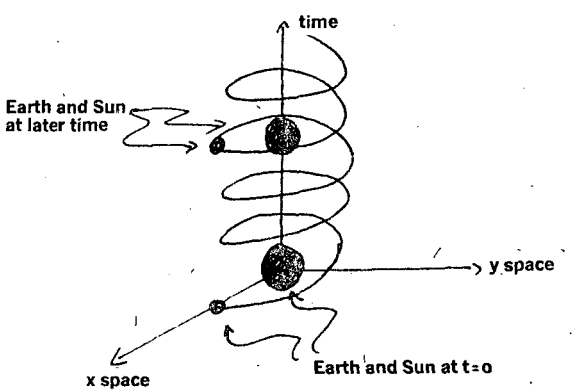


FLAT SPACETIME



CURVED SPACETIME



SUN AND EARTH TRAVELING FORWARD IN SPACETIME

FIGURE 3.

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How can we reconcile these two seemingly contradictory statements?

No doubt the reader has heard of black holes where all the matter of a star has disappeared into a region of infinite curvature in the center. The disappearing matter leaves behind it the gravitational field of a star. This field is curved geometry without anything at the center. That such a thing is possible only requires that we accept General Relativity at face value. There is energy and therefore mass, by $E=mc^2$, in everything physical, and General Relativity says that the geometry of spacetime is physical. The conclusion is clear: Geometry has mass.

Actually, this is a sloppy way of talking. Consider the energy of an electromagnetic wave or any other electromagnetic field. The famous formula $E=mc^2$ can be inverted to read $m=E/c^2$. Thus, the energy of the field has a mass associated with it and therefore, like any mass, has a gravitational effect on other bodies. Think of the electromagnetic field as a sponge which can store energy. By analogy, the gravitational field itself is a storehouse of energy and consequently of mass. So you see, the gravitational field itself can serve as the source of a gravitational field. In some cases, as in Taub-NUT, it is the only source of the gravitational field. In relativity, gravitation is replaced by curvature of geometry and, therefore, we have the interesting possibility that curvature can cause itself.

Now that we have most of the neccesary concepts in hand (and hopefully in mind), let's take the Taub-NUT model as an example and see if it is useful in describing any part of the real world. Part of this model was invented in 1951 by Taub. Newman, Unti, and Tamburino found an apparently unrelated model in 1963, and it was Misner who coined the notation NUT and showed that both are part of the same mental—ah, cosmological model. It is one of the cases we mentioned, an empty universe in which curvature exists without matter. In order to examine the properties which are caused by this absence of matter, we refer the reader to Figure 4.

You will notice that the Taub-NUT model has three regions; two "NUT" regions separated by the "Taub" region. None of these regions exactly represents the real universe, although the Taub region is the closer of the two types. However, the General Relativity equations which were used in deriving this model show that in the absence of matter the model must be highly anisotropic. Therefore, even the Taub region differs from the real uni-

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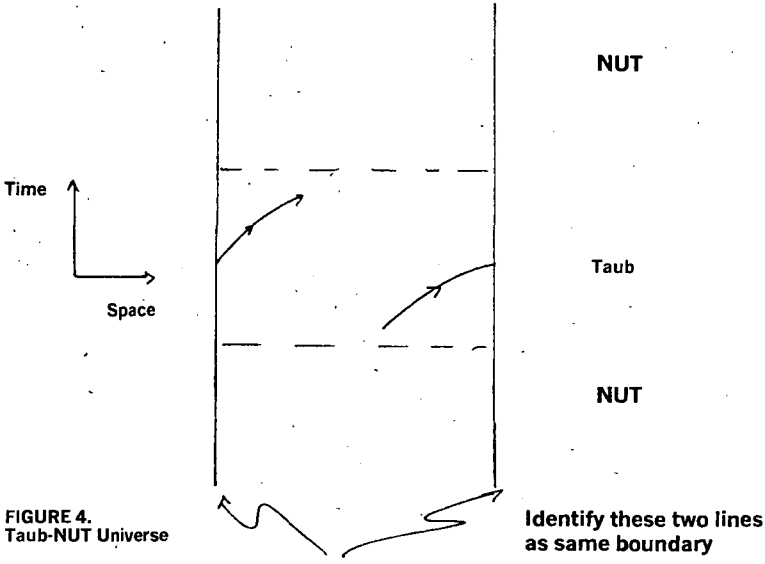

FIGURE 4.
Taub-NUT Universe

verse, first in not having any matter, and second in being anisotropic. The NUT regions, in some sense, look like the gravitational field of a black hole and originally were thought to be a new type of black-hole model. Basically, however, the regions differ from each other in their geometry and this geometry is hard to describe without four-dimensional formulae. We can, though, draw some of the effects of the geometry in the various regions, as in Figure 4.

The reader will see that we've drawn two vertical lines. These two lines are to be thought of as actually the same boundary for the following reason: the TAUB region is closed in the same sense that the surface of a sphere is closed. In order to draw a map of the surface of a sphere on a flat piece of paper, we have to draw in an artificial boundary. When a particle reaches a boundary traveling east, it continues to travel east in reality, but on the map it looks as if it suddenly jumped to the western boundary. Think of a map of the world with the boundary at the international dateline. On the map, a traveler leaving China seems to reach the dateline and suddenly appear on the left side of the map as he travels on to San Francisco. In reality of course, he doesn't do any jumping at all. The discontinuity is forced on us by the constraints of a two-dimensional map.

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Although we've drawn the map closed in space by putting in the artificial boundaries, we have not closed it in time. This is because there is a difference between the Taub and NUT portions. In the Taub region, a particle moving forward in time will always appear to be going toward the top of the drawing. In the NUT region, the direction of time is sufficiently altered so that a particle which moves forward in time may circle the universe and, after circling, find itself moving back toward the bottom of the drawing. Unfortunately, we can't draw the time direction in the NUT portion accurately since we'd need at least a three-dimensional drawing. But we can, at least, schematically indicate what will happen. See Figure 5.

The obvious objection to the behavior just described is that it violates causality: A particle started out moving forward in time, and it ended up moving backwards in time, so that it could conceivably enter its own past. Such behavior is usually enough to relegate any model immediately to the white elephant category.

But let us not jump to conclusions before we try to salvage some useful information out of Taub-NUT. Remember that we put in a particle moving through spacetime even though we had previously stated the model was empty. This particle is known as a test particle. A test particle in physics is infinitely small and thus does not possess properties which disturb the quantities it is measuring. Unfortunately, in the case of Taub-NUT, even the smallest amount of matter, even a test particle, destroys the model completely. The Taub portion is relatively unaffected but the Taub-NUT boundaries are changed into singularities, leaving a Taub-like spacetime without the NUT attachments.

The reason matter destroys the Taub-NUT boundaries is that some of the test particles circle the empty Taub region an infinite number of times before coming to the boundary. In the circling process, a piece of matter comes arbitrarily close to the speed of light. It also comes arbitrarily close to itself since it is circling like a cat chasing its tail. All of this is possible, first because the circumference of the universe is becoming smaller and smaller near the boundaries, so the particle becomes able to circle the universe in an arbitrarily short amount of time. And second, as the particle approaches the speed of light, its personal time ("proper" time) slows down, and it thus measures the time of circumnavigation going to zero.

Because the particle is coming infinitely close to itself and to any other test particles which may be present, the effect is that of an

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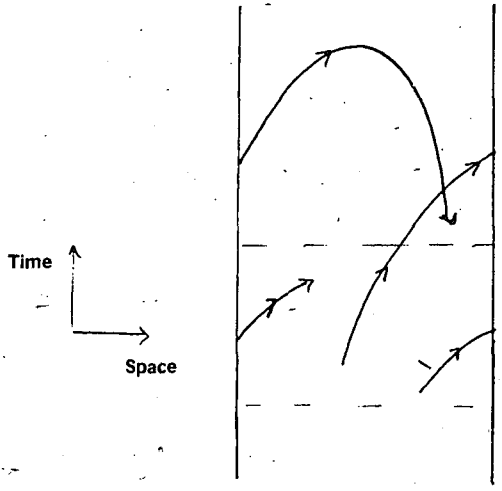

FIGURE 5.
Motion of Particles
in Taub-NUT

infinite density producing a singularity. And there is a potentially useful piece of information from Taub-NUT. It may be that the structure of the early, dense phases of the real universe, when the circumference was very small, involved such a process, namely matter interacting with itself and with other matter from around the universe. However, in the standard model, matter is not allowed to interact except with a vanishingly small volume around itself near the Big Bang.

This non-interaction among particles points to a big problem with the Big Bang model. If particles in the standard model cannot interact with each other near the Big Bang, then how does the universe "know" to start off so regularly and isotropically? Why doesn't each particle, since it can't have any interaction with the others, behave in any way it choses, thereby producing a chaotic result instead of the isotropic universe we observe today?

This problem with the standard model is another argument for looking at off-beat models. For example, in trying to answer the above question, Charles Misner described just such a chaotic universe, with particles behaving in any way they please, which nonetheless becomes regular as it expands. He called it the Mixmaster model.

Misner patterned his Mixmaster model after none other than the Taub-NUT model. He discovered that in a large class of mod-

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els, an initial anisotropy is damped out as the universe expands because the matter is homogenized. This homogenization involves an averaging, or mixing process, blending the properties of one part of the universe with other parts, requiring particles from large distances. These particles are envisioned as particles which travel around the universe in the same sense that particles travel around the Taub-NUT model. The Taub-NUT model is used as a starting point, and the Mixmaster process blends that initial anisotropy into isotropic mush.

By now, the reader probably suspects that there is a bug somewhere in the Mixmaster model and that cosmic blender hypotheses do not, in fact, work. And this is, in fact, the case. We know that the universe is isotropic now. Here we are just trying to show that isotropy now is consistent with anisotropy in the early universe. Since Misner published his model, the work of Barrow showed that the abundance of deuterium is indirect evidence that the universe was isotropic at very early times, about 200 seconds after the Big Bang. The Mixmaster model would probably still be anisotropic then, and thus we are forced to continue our search for other models.

Before searching, however, let's look more closely at the details of the deuterium-abundance argument. The deuterium abundance we observe in the universe today depends on how the temperature varied in the early stages of the universe, as well as the matter density at that time. When the universe was very dense, it was so hot that deuterium and other elements were produced by hydrogen fusion. If it had cooled slowly, or if the matter were dense, then deuterium would have combined to form helium, since this formation process takes place rather easily. Now, we observe deuterium in space, but not very much, and are forced to conclude that the universe cooled rapidly, within strict limits, since the production of helium is very sensitive to the cooling rate. The cooling in question occurred about three minutes after the time that the standard model says was the Big Bang. The best explanation for the cooling rate turns out to be that the universe was already relatively isotropic and low in density by that time. In short, a universe which was anisotropic three minutes after the Big Bang would produce more deuterium than is observed.

It should be mentioned that some scientists, for example, Steven Weinberg, find this line of reasoning unconvincing and are willing to consider current astrophysical phenomena, such as supernovae and quasars, as the source of the observed deuterium.

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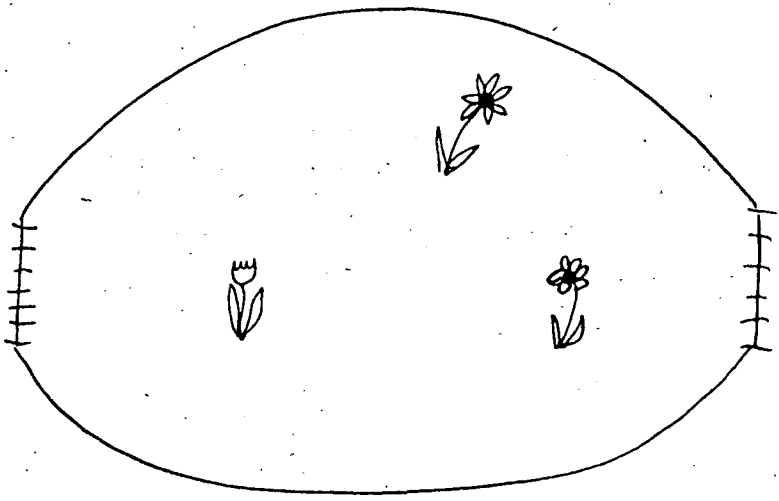

WHEELER'S UNIVERSE

FIGURE 6.

Incidentally, one of the conditions for this rapid cooling we've been talking about is that there exists too little matter to halt the expansion of the universe, and therefore, it seems that the universe will keep expanding forever.

Bothered by the possibility of eternal expansion, a number of leading cosmologists have concentrated on models which recollapse, this recollapse going hand-in-hand with the closure of space. John Wheeler, working from the ideas of Einstein, for a long time concentrated on such models. In fact he drew Figure 6 for a student of one of us. John described the universe as a field of flowers with a gate at either end. We don't know whether the gate is open or closed until we get to it. The student was impressed.

We have by no means exhausted the various types of cosmological models; in fact, we have barely begun. The list could literally go on to infinity. To make life easier for the cosmologist, most of the models in this potentially infinite list are grouped into classes which describe their properties. These classes are based on

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mathematical rather than on physical ideas. This immediately creates the problem that most of the models within the classes are suspect as far as their "reality coefficient" goes. (The Rothman Reality Coefficient is a number, lying between 0 and 1, which is assigned to the statement under question. True statements receive a 1, while obvious nonsense gets a 0.) Whether these models have a low enough reality coefficient to justify throwing them out is one question; what is the rationale behind the mathematical classification scheme is another.

First, we will talk about the mathematical classification scheme. The most important general classes of models are **homogeneous**: *At a given time the universe looks the same at any point*. (Memorize this sentence also.) Contrast homogeneity with isotropy: Isotropy means that at a given point the universe looks the same in all directions. Homogeneity can exist without isotropy (but not vice versa). Consider a rubber sheet which lengthens faster than it widens. The expansion process is identical at every point on the sheet, but at any particular point the expansion is *not* the same in all directions; it is faster in one direction than another. Thus, in an anisotropic, homogeneous model, the universe looks the same from any one point as it does from any other, but the universe does not look the same in all directions from any one of these points. Homogeneity without isotropy.

Homogeneity allows for a vast number of different models. Some of these, although not all, have phases remarkably like the present epoch of the real universe. In order to classify these models it is convenient to use mathematical ideas, and the most useful of these happens to be the work of Bianchi, an early twentieth century mathematician. His work in pure mathematics classified algebraic three-dimensional objects into nine classes. These nine classes of algebras correspond to the nine ways that space can be made homogeneous. The nine classes of homogeneous cosmological models are called the nine Bianchi Types. Types I,V, and IX are the ones most useful in programs such as Misner's attempt to show that a chaotic model automatically becomes isotropic as the universe expands. The Mixmaster model is a Type IX cosmology which is not initially isotropic but which later becomes isotropic.

So, if you take all the potential models which the Bianchi Types allow, you can come up with an infinite number of models. And yet, we still have not solved our original problem: Why is the real universe extraordinarily isotropic? Let us reemphasize by reminding the reader that the deuterium abundance shows that the uni-

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verse must have been isotropic only 200 seconds after the Big Bang. None of the off-beat models we have been discussing can satisfy this condition and, at the same time, look like our universe now.

Nonetheless, there is a conceivable use for the Bianchi Types, however fantastical it may sound. This is in quantum cosmology. In quantum mechanics, matter has wavelike properties. At a given point in spacetime the net effect of, say, a particle, is due not only to where the particle is but to its entire past history. In fact, the effect depends on all possible histories of the particle. There are no everyday examples we can give to illustrate this phenomenon, but perhaps the following will suffice: Think of a wall being shaded by a screen with two holes in it. An electron beam which reaches the wall from a source on the other side of the screen is detected showing a wavelike interference pattern. (See Figure 7.) This interference pattern can only be explained by recognizing that the beam's history involves both holes. No individual electron can be said to go through one hole or the other; rather that the beam goes through both holes is the only thing that can be said.

Think of the universe as a particle. (See Figure 7 again.) Its present form is a pattern which can perhaps only be explained by taking into account all configurations which were possible in the past. These configurations include the Bianchi Types, as well as all others, but you can't say the universe was ever "in" any one of these classes. What we are saying is this: The present universe is, in some sense, made of all possible universes, and that's the reason we have to study all possible universes.

Now, you might think that this is an impossible task, or that God is being malicious, or physicists stupid. We do (alas) admit that quantum cosmology is not the real reason people study these models. The main reason is that cosmologists are trying to understand Einstein's theory of relativity and its various ramifications. This endless theorizing might strike the reader, as it often strikes at least one of us, as being no more than a glass-bead game in which the real universe is of secondary concern. And this relegation of the real universe (if there is such a thing) to secondary status is what has produced all these "metaphysical" cosmologies. However, work is being done to modify General Relativity in such a way that these odder types of models would automatically be excluded. In quantum cosmology, therefore, these models would not contribute to the present universe.

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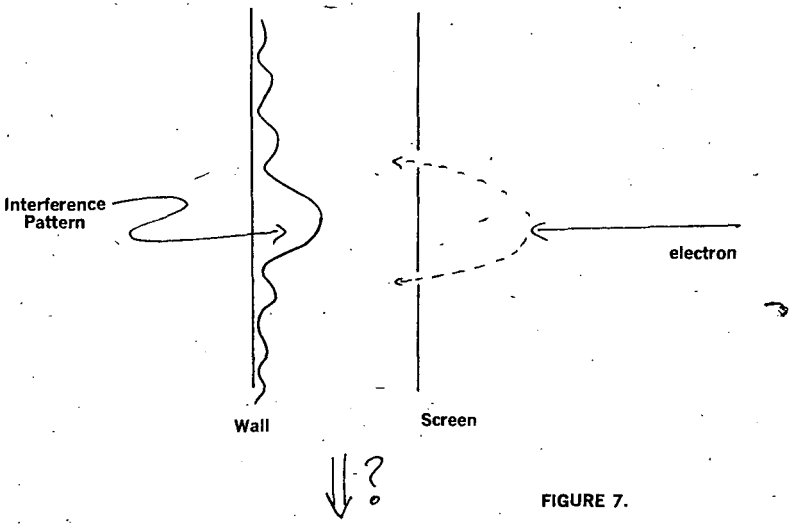
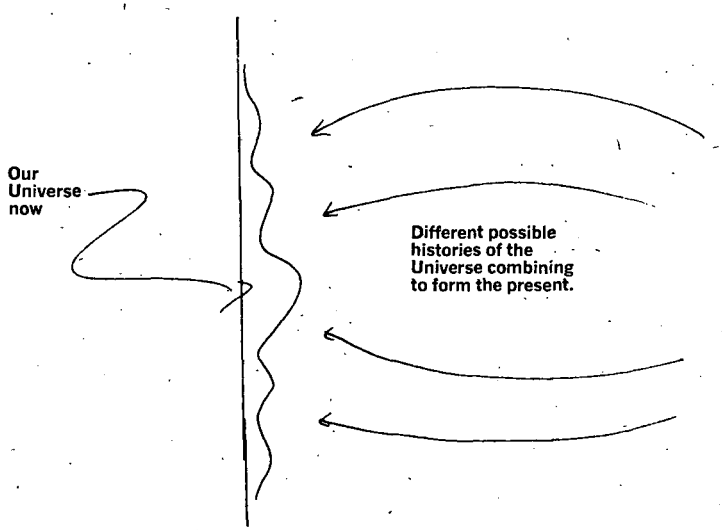


FIGURE 7.

A QUANTIUM UNIVERSE?



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What some people are searching for is a general principle which would eliminate all models except the isotropic ones. The only other possibility is to damp out the anisotropy from a chaotic model, as we've been discussing. Since this latter approach has not thus far been successful, some theoreticians search for the underlying principle. Some progress has been made in this direction by Derek Raine. Raine was trying to set restrictions on what is allowed to be an acceptable model in relativity. These restrictions are meant to be a mathematically precise set of conditions which must be imposed on any solution of Einstein's equations of relativity. The starting point for these restrictions is Mach's principle.

Ernst Mach believed that any talk about "absolute space" was meaningless and that it only made sense to talk about what we can observe. Can we, as Newton claimed, observe motion with respect to absolute space? No, Mach would answer. The only motion we can observe is that relative to something. That something is usually taken to be the body of the fixed stars, the nearest thing we have to an absolute reference frame. This notion that it is only meaningful to talk about motion with respect to the fixed stars is called Mach's principle.

Now, consider a rotating cosmological model. Any such model must be anisotropic because the axis of rotation defines at least one preferred direction at each point. However, it would seem that such rotary motion is contrary to Mach's principle because there is no outside matter to which the rotation of the entire universe can refer. In trying to put Mach's principle on a mathematical footing, Raine's results were that only an isotropic model can fit the principle.

But is Mach's principle compatable with relativity? The question is still not settled. Einstein thought he was building a theory based on Mach's principle, in which matter alone determined the geometry. But it is clear that his theory allows many models, like the notorious Taub-NUT model which we have discussed, which have no matter in them whatsoever, and yet still have geometry. The existence of this model could well be inconsistent with Mach's principle.

Moreover, it seems that if Mach's principle is correct, then the expansion of the universe itself should have some effect on local physics. As the reference frame of the fixed stars expands, local motion should become easier. After all, if it takes a certain amount of effort to move one percent of the distance between the

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two galaxies, it should require no more effort to move that one percent at some future time, even though the distance will be greater. We realize this argument is non-rigorous, but there should be some effect of this kind. Perhaps the masses of things should go down as the universe expands, making motion easier.

Both Robert Dicke and P.A.M. Dirac have developed theories along these lines. Dicke, with Carl Brans, devised a theory which did try to incorporate some aspect of Mach's principle by allowing the gravitational constant itself to be determined by the distribution of matter in the universe. Their main motivations were to provide an alternate theory to General Relativity for use in testing the latter. By having this alternative theory we can decide which tests most sensitively distinguish between relativity and a viable alternative.

And there have been recent tests (carried out by that strange kind of physicist known as the experimentalist), and relativity has won out over Brans-Dicke, as well as all other contenders. At the end, we seem to be left with our initial problem. By withstanding all the observational tests, relativity has burdened us with the task of explaining why the universe is so isotropic. We must also come to grips with Mach's principle and decide whether it is compatible with General Relativity, a point not at all clear at the present time. Maybe there are other theories, like the Brans-Dicke theory, which provide a better framework for Machian cosmology. Or perhaps the real world does follow General Relativity and even the far-out models we've talked about all contribute to a quantum theory of cosmology. However, one of us suspects that Gödel's theorem, which states that a self-contained mathematical system must be either incomplete or inconsistent, may also apply to physics. If so, any theories we devise will all necessarily be unfinished.

A pessimistic vision? Perhaps, but at least it has the advantage that, if true, physicists will never be out of work.

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THE QUINTESSENCE OF GALAHAD SYPHER

by Joseph Kosiewska

art: Ron Miller

The author is 28, a teaching fellow at State University of New York—Buffalo, generally impoverished, usually happy, married to a Quebecoise who patiently puts up with his feeble attempts at fractured French. He has a BA in English Lit. from Fordham and an MA from SUNY-Binghamton. Mr. Kosiewska has worked at a variety of odd jobs (a Knave of all trades, Jack of none, is how he puts it) and is currently working on his dissertation and a novel tentatively called Apocalypso, *a book that has nothing to do with worlds ending or with happy-go-lucky fishermen.*

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Today, at long last, I am Galahad Sypher.

It has taken me forty years, my friends, to be able to say that; and I still say it with a certain amount of frank disbelief. Some of you perhaps know the feeling: the nausea, the self-doubt, the face that belongs to someone else staring back at you in the mirror. It's only human, after all; and it passes. For someone like myself, however, not quite the total man, it never passes completely; and a few of my more radical friends insist I should be bitter about that. I am not. In fact, I come before this committee neither for nor against the proposed nationalization of genetomorphic engineering. I am, though, what they call an interested party; and I expect you will find what I have to say useful. The distinguished scholars and scientists who have spoken before me have already outlined the more obvious pros and cons, but none of them can tell you what it *feels* like to be an artificially engineered genetomorph.

I can.

I am the end product—one of the end products—of the famous Sypher Institute Experiment that took place at the turn of the century. I have no mother, no father, no parents of any kind—unless they be the scientists who first conceived of me as a technological possibility—but do have four synthetic brothers who in size, shape, and texture are exact reproductions of myself. Or rather, to state it properly, we are all exact copies of each other, exact copies of some predetermined chemicogenetic pattern. Were it not for the letters tattooed on the soles of our feet—*A*, *B*, *C*, *D*, and *E*—there would be no way to tell us apart; and it is safe to say, I think, that none of us have ever gotten over that fact. Indeed, not only did we look and sound the same back at the Institute, we thought the same, shared the same memories and feelings, often said the same things at the same times. Imagine then, if you can, how life must seem to us.

Part of the fault, I suppose, lies with the Institute. Because we were the first of our kind, and because of certain long-range plans for our observation, we were kept together in almost complete isolation the first seventeen years of our lives. It was not an unpleasant existence. We always had anything we wanted or required, and any emotional problem that might have arisen because of our ancestorless condition was adequately forestalled by a staff of competent psychopathologists. We rarely left the Institute Compound, however, and then only for short excursions to the countryside, never to the city. And we were not permitted to

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get away from each other for more than a few minutes—perhaps for reasons that are best explained by the Director of Project Sypher himself, Professor Eugene Bender. We were always made to wear the same clothes, without nameplates—indeed, we had no names for many years—to live in the same quarters, in identical beds, to attend the same classes and activities, learn the same skills, play the same games, and so on. Our environment was strictly controlled. As soon as we were old enough to grasp certain mathematical concepts, we were taught that if *A* equals *B*, and *B* equals *C*, then *A* equals *C*. And *D*, of course. And *E*.

There was a brief period in our lives when we lived in a kind of mutual contentment. The records say as much: that up to about the age of six or six-and-a-half we got along quite handsomely. Fraternal affection never entered into it, though. My brothers and I have always been somewhat cool to each other, even back then—how would *you* feel if your reflection suddenly stepped out of the mirror?—but at the time we had no way of knowing that what we were part of was not necessarily the most natural thing in the world. In fact, there seemed to be overwhelming evidence to the contrary. I remember with particular vividness one afternoon when the five of us, all dressed in tiny navy-blue jumpsuits, discovered a flock of pigeons roosting in an open field behind one of the lab buildings. There were hundreds of them dozing in the sun—white, motionless, indistinguishable from one another—and we stumbled upon them in our aimless explorations as one stumbles upon something extraordinary in a dream. They were so unexpected and lovely in their uniformity that our hearts took a leap. We waddled in among them, anxious to participate somehow, and our intrusion set off an explosion of wings. They rose so precipitously, again as a single body, a snowstorm of cries and feathers, that we tumbled over in our craning efforts to keep them in sight, noticing as we fell that the grass beneath us was also nothing more than an endless series of repeated individuals, swaying together in one movement at the gentle insistence of the wind; and we had a childlike intimation (each of us did, I'm sure of it) that life was like this, that it was natural and good to be like those pigeons, those blades of grass.

This magic harmony did not last very long. We learned soon enough that in our sameness we were essentially different from others; that while we were exact duplicates of each other in every way possible, none of the people living with us and observing us were duplicates of anything or anyone in any way at all. We also

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discovered early on that unlike our observers we possessed brains that seemed to function on the same wavelength, that when a notion entered one of our minds the chances were it had entered all of them. When one of us craved ice cream, the other four did. When one of us wanted to visit the library or look at Sam the watchman's gun, so did the others. When one of us had to relieve himself, he'd run into his shadows outside the bathroom door. Professor Bender told us not to worry—"It's just a phase you're going through, boys"—but it became increasingly difficult to follow his advice. Something was wrong, very wrong, and despite the assurances of a whole staff of counselors it occurred to us that perhaps we weren't real human beings after all, but test-tube freaks, the multiple shadows of some biochemical formula.

It was about this time—when we were seven or eight, I believe—that we began a silent campaign to differentiate ourselves. Without saying anything, we searched for differences. The smallest bruise or scratch became for us a badge of identity, and we marked ourselves up every chance we got. Mosquito bites and bee stings were especially treasured. We also argued quite a bit, not about what to do—what to eat, which games to play, et cetera—for we always agreed about that sort of thing, but about who had thought of it first.

"Let's go swimming," one of us might suggest.

"Yeah, sounds great," another would answer.

"Okay."

"Me too."

"Hey, just what *I* was thinking."

"Really? Well, I was thinking of it this morning."

"No you weren't. I thought of it first just now."

"But *I'm* the one who said it first."

"No you're not. *I* am."

"You? You're crazy. *I'm* the one—"

"You are not! You only think you are."

"Oh yeah? Well I think you're *all* crazy."

And so on, relentlessly, until everyone was at everyone else's throat. We each wanted the credit, you see—the sole credit—for the lives we lived. We each wanted desperately to prove to the others who the original was, who was separate and distinct among us and therefore better and somehow superior. We quarreled this way often. And we quarreled bitterly. There was one rhubarb, I remember, that almost brought us to blows—would have, in fact—had not Professor Bender himself intervened.

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"Those letters on your feet," he told us, the smiling peacemaker, "were assigned randomly. They have no significance whatsoever. None." That ended the argument, but it was not, I'm afraid, what we wanted to hear. We were tired of the old formula, of *A* equaling *B* equaling *C* and so forth. We were tired of being like pigeons, like blades of grass.

Years passed, and problems multiplied. We continued to lead uncomfortably paralleled lives. Puberty surprised each of us at the same time. So did acne. Our individual scores in various intelligence tests never varied from one another. Neither did our choices at the dinner table. In the December of our fifteenth year we each broke the same right leg in the same place by falling out of the same tree at the same time. The following January we each banged the same left thumb. And so on. It got to be quite monotonous. Our constant arguments, hampered by the futility of our trying to find something to argue about, eventually tapered off into morose grunts and shrugs. We began to hate each other a little. It was only natural, then—and really, it surprised no one—that when one of us finally fell in love, the rest of us did, simultaneously. And, needless to say, we all fell for the same woman.

Ms. Edwards—Josephine—was the last item in a life-long list of humiliations. A slick ladies' magazine, with the grudging approval of the Director, had sent her to photograph and interview us on our eighteenth birthday. She was a beautiful, warm woman, or seemed so to five boys who had seen very few women in their day, except for disinterested, if not unattractive, scientists and therapists. She had blond hair and a nicely turned pixie nose and deep blue eyes that always seemed to be extending some sort of invitation—what kind our inexperienced young minds could only guess at. The three days she spent at the Institute were devastating. She tousled our hair and winked at us and complimented us on our good looks and tousled our hair some more; and when she left, she left us in a burning confusion: lonely, empty, and desperately jealous. Not knowing what else to do, not able even to look each other in the eye, we crowded without a word into Professor Bender's office.

He was sitting behind a huge mahogany desk when we entered, his overlarge head bent over a stack of reports. "Well," he said, "what can I do for you boys?"

We all spoke at once.

"Hold it, hold it. One at a time." He pointed to me. "Which one are you?"

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"*B*," I said.

"Okay, *B*, why don't you tell me what the problem is."

I swallowed and looked at my four doppelgängers. "I want to marry Ms. Edwards," I said.

There was a moment of pained and puzzled silence. Then all hell broke loose.

"You can't marry her. *I'm* going to marry her."

"You? You're nuts. *I'm* going to marry her."

"You're all nuts. She's marrying me."

"The hell she is! *I'm* the one she's in love with."

"Oh yeah? She loves me more than she loves any of you."

"No she doesn't. She loves me."

"No she doesn't. She loves *me*!"

"I saw her first. First come first—"

"You did not! *I* saw her first."

"What are you guys talking about? *I* saw her first!"

We carried on like this for some time, pushing and shoving and trading nasty remarks, until we noticed the Director was staring as us as if we were mad.

"I'm afraid none of you is marrying anyone," he said, and he said it so softly, so apologetically, that we stopped our bickering and looked at him. He shrugged. "I should have known this would happen. I'm sorry boys."

The place was as quiet as a morgue. "What do you mean?" I said.

He gestured helplessly with his hands. "You wouldn't understand. Ms. Edwards is a professional interviewer. It's her job to flatter and flirt a bit. That's how she gets people to do what she—" He hesitated a moment, a guilty quaver in his voice. "Anyway, I understand she's already engaged to someone else."

We were stunned. We stared blankly at the wall. Bender studied us compassionately—or dispassionately. It was hard to tell.

"So you see," he said, looking down at his desk, "it doesn't matter which of you saw her first. Love doesn't work that way. Unfortunately, it didn't occur to me that Ms. Edward's presence would affect you so violently. A mistake on my part. But you're young, you'll get over it, it's just a phase—"

—we were going through, yes. He was well-launched on his usual sermon: that we were special people, that right now it was necessary we remain isolated, that in a few years we would understand. But this time we were not buying it. We glared at him,

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each in the same malevolent manner, until our quiet rage forced him to break off his monologue.

"You fellas still seem upset. You're taking this all too—"

"Why are we like this, Professor?" It was *E*, I think, who said this.

"Like what? And call me Gene, won't you? After all, you've known me all your lives."

"Professor, why *are* we like this?" It was I who spoke this time. My face, like those of my fellow duplicates, was beaded with perspiration. "Why are we so—so interchangeable? I know we have to look alike, but must we always act and feel alike, too?"

He smiled. He rearranged the papers on his desk. He patiently began to rephrase his sermon: that we all knew, of course, the special nature of our origin; that therefore we were special people and it was necessary to isolate us from the general population, at least for a little while; that in a few years—

It was useless. The five of us walked silently out of his office.

Several unhappy weeks later, one morning after breakfast, we found a note waiting for us in our room. It was from Ms. Edwards:

> Dear *A, B, C, D, E,*
>
> Professor Bender has told me about the pain I've caused you. I can't tell you how sorry I am. Really, that's not what I intended. I wish I could give you happier news, but you see I'm already seeing someone else, and anyway, how could I ever choose between five such lovely guys? With affection,
>
> Josephine
>
> P.S.—I know I'm not supposed to (so don't tell Prof. Bender), but I've enclosed a copy of my article about you. Hope it cheers you up.

Her intentions, I'm sure, were altruistic, but none of us felt like smiling. So not even the love of our life could tell us apart! We were miserable. We moped and moaned over that letter and wept on each other's shoulders and silently cursed each other, plotting revenge, plotting God knows what; and when we got around to reading the article itself, which reported all those echoed words of ours, all those echoed and echoing gestures, there was another round of tears and recriminations. We did not immediately notice a second, smaller interview—apparently done by someone else—that appeared in the lower corner of the same magazine page. We

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did read it eventually, however. And then we reread it.

> But tell me, Professor, why do you keep them together like that, so cut off from the outside world?
>
> *Prof. B*—It's part of the study. A controlled experiment, you might say, in developmental psychology. We've taken five genetic and biologic duplicates and put them in an environment where all the stimuli are the same, where there is no opportunity for varying experiences.
>
> *Int.*—But to what end?
>
> *Prof. B*—We want to see if these five boys can develop under these conditions a sense of their own individual personalities, if they can sort out and separate their own egos from this morass of sameness. They present us, really, with a unique opportunity to study how the human mind establishes identity, how it distinguishes itself from its surroundings.
>
> *Int.*—I see. Sounds fascinating. But it must be hell on your subjects. Are they aware of what they're part of?
>
> *Prof. B*—Oh yes, they know all about it. They're very brave, very heroic lads.
>
> *Int.*—And how is the experiment proceeding?
>
> *Prof. B*—Well, so far I'm afraid it's been something of a disappointment. None of the lads has as yet done anything to distinguish himself from the others. But we're still hoping.

So that was it: we were an experiment in developmental psychology, and a failed experiment at that. We had known nothing about it, despite our keeper's casual disclaimer, because such knowledge would obviously have contaminated the results. No wonder he was always telling us we were special, not to be touched. No wonder Josephine—and perhaps she too had been a part of the experiment, a controlled stimulus—could so easily entangle our minds and hearts. No wonder we hated each other so much.

"Well," I said, to no one in particular, "what should we do now?"

It was a rhetorical question. When you are little more than the parody of a real human being, there is only one thing you can do; and if we had been able to find enough rope we probably would

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have done it in high style—all in a row from some basement beam. There was no rope to be found, however. Nor any effective poison. Nor any roof high enough to be fatal. We were stumped for a while, I must admit, but then we thought—all at once, of course—of good old Sam the watchman's gun. We jumped the old fellow near the Institute gates, knocked him out as gently as possible—we were not ruffians after all—and proceeded with our well-oiled final solution to the Compound Library, where the stacks and stacks of books and microfilm would surely muffle the noisy business of dying. We found a particularily quiet and remote recess, and settled into it.

A problem, however, soon presented itself: there were five of us, and only one gun. Barring an impossible trick shot, the desired simultaneous suicide was out.

"Looks like we'll have to do it one at a time," I said.

The others nodded.

"So we take turns. So what?"

"Well, we've got to decide the order. Who should go first?"

"That's easy," said *E*. "We'll do it alphabetically."

A glared at him. "I don't think that's such a good idea," he said.

I agreed. "Let's not get into one of our stupid arguments, okay? How about drawing lots?"

We selected a book at random from the shelves, *The Long Goodbye* by R. Chandler, and tore page sixty-one into five strips, four of them of equal length. *C*, as it turned out, ended up with the short one.

"So," he said, looking a little lost, his face pale, "I guess this is so long."

"So long," we echoed.

He studied the black, oily thing in his hand. "Where do you think it'd be best to point this?"

"At your temple," I suggested. "That'd be the most effective place. And probably the most symbolic."

"Is that where you plan to—"

"Of course. Do I have a choice?"

"Now wait a minute," said *D*. "If we're going to be symbolic about this, don't you think it should be the heart?"

"Yeah, maybe you're right," said *C*.

I firmly shook my head. "No. The temple's better."

"How can you be so sure?"

We argued about it for a few minutes, then stopped, suddenly embarrassed.

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"This shouldn't be happening," said *A*.

"You're right," said *D*, trying to hide his confusion, "we're just wasting time. Shoot yourself any way you want, *C*. It'll be your final gesture of defiance."

C nodded, and pointed the gun at the bridge of his nose. "So long," he said.

"So long," we echoed.

There were a few moments of embarrassing silence. *C* continued to point the gun at his nose.

"Well?"

"Give me time, will you?"

We gave him time. There were a few more minutes of embarrassing silence. *C* lowered the gun.

"I've been thinking about this," he said. "How do I know you guys won't change your minds after I'm gone?"

"That's impossible," said *E*.

"I'm not so sure. Give me your word of honor."

We gave him our word of honor. He raised the gun to his nose, then lowered it.

"Are you sure there are enough bullets in this thing?"

"Quit stalling," I said, "there are six chambers. More than enough."

"We could at least check, don't you think? Maybe Sam's careless about how he loads his weapon." He broke the gun barrel open and examined it. Sam *had* been careless. "Hey," he said, "there are only four bullets here. You know what that means? That means one of us—"

We all looked at each other and mentally finished the sentence: one of us would have to carry on without the other four. It was suddenly and inexplicably an attractive idea, and for a brief moment the potential suicides became potential murderers. We scrambled for the gun, rolling over and wrestling with one another on the floor. There was a loud report; and an anonymous little volume on a far shelf, shot through the bindings, fell over dead.

The five of us were unhurt, but shaken. *C* tentatively touched his face and chest, then smiled in relief. "One shot per customer," he said. "Who's next?"

We laughed at that. I'm not sure why, but we laughed. A certain something had lost its hold over us. A corner in our emotional lives had been turned, never to be seen again; and we sensed that, sensed that from now on things would be different,

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very different; and so for once we could afford to laugh. The old formula had proven untrue: equations did not always have to balance out; there was room for variation. It was a happy moment, I dare say the happiest in our lives; and I think we would have fallen weeping into each other's arms had we not still resented each other for loving Josephine and had we not entertained a dim but persistent suspicion that perhaps we were only acting out one more part in Professor Bender's ubiquitous experiment, that perhaps the whole scene in the library was a setup, that perhaps even now there was an unwanted eye watching us through a peephole in the ceiling. It seemed unlikely, but we did not want to chance it.

"We can't stay here any longer," I whispered. "This place is death for us. We've got to get out—and now."

"You're right," said *A*. "They won't let us be ourselves here. They won't let us be different."

There was one more thing to be done, however, before we could leave. We marched silently, and in no particular order, to another, older section of the library. There, amid a welter of ancient geneologies and thesauri, we found what we hoped to find: a massive, dust-covered, sacred-looking to me, *John Doe's Book of Names*. Our patronymic would be Sypher, of course—we were brothers of a sort, after all, and the Institute had been for us the closest thing to a parent—but the first names were selected by individual choice. *A* became Nicholas; *C*, Gabriel; *D*, Vladimir; *E*, Augustine. I became Galahad. We shook hands, then, and hugged

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each other and said goodbye. And that night, under the propitious darkness of a new moon, we slipped out through an opening in the outer fence and went our separate ways.

That, my friends, was the last time we saw each other. We've not been together since—almost twenty-three years—though we have maintained an informal sort of contact. We've kept tabs, in other words. Nicholas joined the circus soon after our separation, and today he enthralls audiences everywhere with his one-man trapeze act. Gabriel began publishing poetry of extraordinary grace and power, his favorite subject, curiously enough, the cosmic oversoul of man. Vladimir became a deep-space explorer and died recently, it sorrows me to say, in a freak landslide on some pointless moon circling Jupiter. Augustine entered a monastery and took a vow of silence he has never broken, while I myself learned all I could about the scientific secrets of my own origin and today stand before you as one of the world's leading authorities on genetomorphic engineering. It's not been an easy life for us. I don't know how many nights I woke screaming from nightmares in which I found myself one digit of a hairy, angry fist, one part of a polycephalous monster. I don't know how many times I turned my head expecting to discover a biological parody turning his head and staring back. I don't know how many times I looked into a mirror and wondered if it was really a mirror, really me. And yet I've endured; we all have. When word came that Vladimir was missing and presumed dead, I found space enough in my heart for grief. It was as if by dying Vladimir had broken the last essential link between the five of us, and now we could push on to what was really beautiful and true about life. I cabled the following message to the others: "We are *not* flocks of birds nor blades of grass. Let us mourn our brother."

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THROUGH TIME AND SPACE WITH FERDINAND FEGHOOT !V

by Grendel Briarton

art: Tim Kirk

Mr. Kirk, whose artwork has become associated with Mr. Feghoot's strange adventures, has recently moved to Colorado Springs.

In 2037, the Give The Country Back To The Indians Party elected the president and vice-president, captured both houses of Congress, and even persuaded the Indians to accept.

Sweeping changes were instituted. Palefaces (all who were less than one-sixteenth Indian) were moved to remote reservations, where they were allowed to perform quaint tribal dances and sell souvenirs to tourists. However, they were strictly forbidden Indian cultural materials—eagle feathers especially.

The first Paleface charged with this crime was one Angus MacGillicuddy, who had used three eagle feathers in what he called "a Highland war-bonnet," and Ferdinand Feghoot defended him before the Supreme Council of Sachems and Medicine Chiefs.

To their astonishment, he summoned the prosecutor himself, Melvin B. Many Thunders, as his sole witness. "Sir," he said, "my client denies that he feloniously obtained these feathers. He avers that he picked them up from the ground in all innocence. Now, isn't it true that a sick eagle generally molts, losing feathers?"

"What of it?" scoffed Many Thunders. "Try proving this guy ever came anywhere near a sick eagle!"

"Prove it?" purred Ferdinand Feghoot. "You yourself have admitted it! It's all in the record. When you denounced Mr. MacGillicuddy, *you* declared they were 'ill eagle feathers!' "

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THE MERCHANT OF STRATFORD

by Frank Ramirez

art: Jack Gaughan

The author is 23, a native of California, is currently exiled to Illinois for his final year at Bethany Theological Seminary, where he is working towards a Master of Divinity degree. He and his wife, Jennie Elizabeth, own a Dalmatian, Sir Groceries Stumblepuppy, and a poodle. This story is Mr. Ramirez's first sale.

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I tensed with anticipation as the straps were tightened. The moment had finally come.

Gone from my mind were the agonies of years in planning, months in engineering, days in language training.

All thoughts were swept behind as I focused my attentions on the task at hand. Imagine! The wonder of it! Traveling back in time to speak with none other than the Immortal Bard himself! Unbelievable!

The greatest poet of all time, the man whose plays were still box-office hits after four hundred years, a man who could speak to and move humanity across the span of centuries—and to think he did it all by accident! For surely he had only written those masterpieces to fill a specific demand, writing parts to be performed by specific actors on a specific stage. What a genius!

In my storage compartment were volumes for his perusal—a concise history of the world through the year 2000, a selection of the greatest poets since the master, selected volumes of Shakespearean criticism, and the massive one-volume *Armstead Shakespeare,* the *definitive* Shakespeare, published in 1997.

What would the Bard think of the changes in technology, of the new direction art had taken, of the advance of our scholarship? I had hopes that the praise of four centuries would comfort him during his declining years, bringing a peace to his soul.

And I wondered, would he accept my offer and return with me to the twenty-first century?

I remembered the trepidation of my staff with regards to the so-called dangers of time-travel. Would my presence in the early seventeenth century change the course of history? It took many days to convince all concerned that their fears were groundless. I was going to visit the *past*. Therefore, if I had succeeded, I had already been there. I had always been there. With a little help from a philosopher of the University, I made my point.

I slept little the night before. I paced furiously, thoughts racing. The fruits of the ages were to be laid humbly at his feet. Would he find the specially bound volumes worthy? Lord grant he would accept and enjoy.

Would our lifestyle shock his sensibilities? Surely not, for he was the universal man.

These and many other questions passed through my mind that night.

After an eternity—morning.

I ate, then donned the costume provided by the Theater De-

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partment. I was dressed as a man of moderate wealth. My beard was trimmed to fit any prevailing fashion. My purse was filled with coin that would serve.

As I entered the sphere I turned and smiled at the white-suited technicians. A quick wave, I slipped inside, and the door was slammed into place. At last I was alone. I clasped the straps, and they tightened themselves. I relayed the readings of several instruments, listened to last minute instructions, and waited.

Tensing, I watched as the chronometer marked the last few seconds. The moment passed—

When the grand millisecond arrived I felt little more than a minor lurch. I had arrived.

My first impulse was to force open the door and run into the open air, to breathe the air the Bard was breathing, to share his world.

Instead, I took two deep breaths, paused, then went through the checklist.

But all the time I thought: 1615! Shakespeare had retired from the stage. Soon I would learn—what would I learn? The exact texts of the plays, perhaps the extent of the canon, answers to all the mysteries, details of his life; did all of these things wait for me?

When at last I completed the checklist I depressurized the cabin, opened the door, and stepped into the seventeeth century.

I also stepped into a pile of dung.

I spent a few moments hiding the machine in some bushes. One of my worries was that I might startle the highly superstitious natives, who, believing in the supernatural, might attempt to do me harm. This caused me to wonder: would the Bard himself believe that he was in the presence of a devil or an angel? Nay, surely *he* could accept the truth.

I sang as I tramped—one mile, two miles . . . Stratford was proving to be farther than I thought . . . three, four, hmmmm . . . six, seven, gasp . . . eight, wheeze . . . was that—? Yes—I could see—I had arrived at—

Stratford.

I hurried, guided by a map prepared by the History department.

It was not long before I reached what could only be New Place, the residence of Master Will. More than a little excited, I approached the gate, passed through it, and stepped forward towards the door. I briefly noted that the actual house was quite different, more—modern, if that's the word, than I had imagined. It mat-

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tered little to me at the moment, however. My heart skipped a beat as I read the name on the plate: Mast. Wm. Shakespear. I had arrived.

I knocked firmly on the door, determined not to disgrace my century. A woman (no doubt the former Anne Hathaway) came to answer. Looking me over with what I thought might be amusement (was there something wrong with my costume?!) she said, "What ho! Stand and present yourself!"

"I have come," I said, "upon a matter of momentous importance. Is Master Shakespeare at home?!"

Hesitating not a moment, she shouted over her shoulder, "Hey nonny, ho nonny, another nonny ninny, Will!"

Mystified, I followed her beyond the door, puzzling over her remark. Leading me down a murky corridor, she at last brought me to a small study, which she indicated I should enter. I did so with much emotion.

There he sat!

Head down, pen racing across paper, the books filling the dim shelves, light streaming through the window to illumine the words divine: Shakespeare, messenger of the gods! What unknown work was he penning, what sonnet unimagined; with what phrase unguessed was he gracing paper as no product of coarse wood deserved to be? In that instant I wished wildly that I was the paper, the ink, the instrument by which the immortal bard—

He lifted his head and spoke.

"Sit down, won't you?" he said. "I'll be with you in a moment."

Something strange there.

But his voice . . . and his words! "I'll be with you in a moment." Who else? Who else could have spoken those words? I resolved at my earliest opportunity to travel further back into time, to the days when a younger Shakespeare graced the stage.

He blew his nose on his sleeve.

Of course, I thought hurriedly, I mustn't judge him by *my* standards. Besides, a deeper problem weighed on my mind. How could I possibly convey, without shocking, my mission to this most excellent member of the human race?

I reached for my camera, determined to save for all time a true portrait of the man who transcended ages. I brought the device to my face, glanced through the view-finder, and prepared to press the button when I noticed that a hand was obscuring the vision of the lens.

The hand belonged to none other than Will himself. I lowered

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the camera. But of course, how stupid of me, the strange instrument frightened him. I would explain its function and—

"Please," he was saying, "No pictures, please. You'll have to clear it with my agent."

Shock. What was I hearing? I was deluding myself, I hadn't heard anything of the sort. I was—

"Listen," I was saying, "I know you'll find this hard to believe, but you must try to understand. Listen carefully. I am—"

"—a man from the future, I know," he finished. "Come now," he continued, "you don't really think you're the first man who's ever—is something the matter?"

"How—"

"Oh! I understand. You must be one of the first. Imagine, I'm in the presence of one of the first time travelers. I'm so very sorry for the shock."

Sorry for the—wasn't that my line?

Suddenly I knew what had bothered me about the way he spoke.

"But you speak perfect English! I mean contemporary! I mean—and your wife!"

"Pretty good, don't you think? I love to get the chance to practice it. It's like a second language. But of course I had to learn it, don't you know, what with all the time travelers from all the different centuries coming and going willy-nilly as they pleased. Come to think of it, it *has* been a pretty quiet day. I think you're one of the first this morning."

I remained speechless, as the implications began to sink in.

He was eyeing my bag.

"What have you got for me?" he asked.

"Got for you?"

"Yes, all of the early time travelers brought me gifts, books, pocket dictionaries, histories, certificates, plaques, that sort of thing. What did *you* bring?"

I emptied the contents of my bag. He quickly glanced at the titles. The books of criticism he threw in a rubbish heap in the corner, along with an expletive.

"Bloody useless things, those, as if I'd written the plays to be read."

The collected works brought a small chuckle. The history he placed in a pile on his desk with the comment, "Might be able to sell this one."

Thinking it over, however, he withdrew it from the stack and

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threw it in the corner with the criticism.

"Not for much, though."

Finally, he perused the volume of poetry. It had a special dedication to the Bard, praising him for his work, laying before his feet these humble trifles, etc. He harumphed, closed it, and looked at me.

"Is this the best you could do?"

I replied, "It was selected by our English Department."

"Figures," he said. "Next time you come, bring some Zelazny."

Zelazny? Who was— He must have read my face.

"Haven't you ever heard of him?" he asked. "And while you're at it send some Asimov too. Can't get enough through channels. I've got almost all of Heinlein's books, but let me see if there's something you . . ."

Tapering off, he turned to face a list stapled—stapled!—below his bookshelf, which I could now see very clearly. The bindings were decidedly un-seventeenth century.

"I remember now!" he brightened. "See if you can find me that issue of *Galaxy* from the summer of 1973. I've been dying to read the end of that Clarke novel."

"Who are all these people?"

"Science fiction writers," he said with reverence. "You fool," he added with derision.

"You *like* science fiction?"

One would have thought I'd cursed the Queen and spit on the Bible by the look he gave me.

"Of course I do. It reminds me of my work."

"I'm afraid I don't understand."

"Well, it's honest, for one thing. I wrote plays, and was looked down upon by my contemporaries for doing so. I didn't write what was considered literature. I wrote to entertain *and* to make a little money. The same thing was true for SF. But what happened centuries after its birth? Let me see if I can find my copy of that variorum edition of *The Martian Chronicles*. Now you've got me sounding like a Heinlein character."

I said nothing.

"Something the matter?" he asked.

"Yes, something's the matter. Speak Elizabethan."

"Maybe later, if you behave. And don't forget, James is on the throne. You should have asked me to speak Jacobean."

"What's going on here?" I shouted. "I'm the first person to travel back in time!"

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"But you're certainly not the first to get here!"

I shook my head as he continued.

"I've been getting visitors from the the future as far back as I can remember. My mother, being a good Christian woman, had the hardest time giving me suck, because the documentary team from the thirty-third century wanted to film it all. I barely survived childhood. Fortunately my father was a shrewd businessman. He managed to capitalize off the circumstances. Of course he spent so much time in negotiations that he couldn't attend council meetings so, you know, he was thrown out, but—say, don't tell me you're surprised by all this. Why do you think I died only fifty years after I was born? I spent forty years in countless different centuries."

"What did you do?"

"Oh, the usual: dedicated hospitals, opened restaurants, christened spaceships, spoke at ladies' luncheons, appeared on talk shows, lectured on what you might call the chicken-and-peas circuit, that sort of thing."

I think I must have been shaking visibly, for he said, "Calm down, have a drink." He reached for a bottle and poured something strong. I sputtered as I downed it in one gulp.

"What *was* that?" I asked, remembering that the bottle and the seventeenth century—

"I'm not sure. Someone from the twenty-eighth century left it here. Well now, feel better? You know, Jesus once told me that to stay calm one should always practice—"

"Jesus?"

"Yes, of course. Some clowns from the thirtieth century thought it'd be a gas for me to meet him. Really nice fellow, don't you know, sort of intense; but he could take a joke. He never forgave me for the character of Shylock, though. Rather petty, don't you think? But then, you have to consider his point of view, and he *was* under a lot of pressure. If you think I've time-travelers in my hair you should've seen him!"

I must have looked forlorn.

"Tell you what, just to show there's no hard feelings, I'll sell you a copy of my complete works, and my autobiography as well." He reached behind and pulled two plastic-bound volumes from two different stacks. One was imposingly thick.

"Here they are, treasure of the ages, all the plays I ever wrote, approved text, cast lists, year of composition, sources, random bits of poetry, and a previously unpublished novel, *Go-Captains in*

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Norstrilia. And this here is the complete autobiography, with all the important facts that led to my becoming the Immortal Bard. Did you live before the twenty-sixth century?"

"Yes."

"Dollars, credits, or muffins?"

"All I've got are these gold pieces."

He looked them over.

"I guess I'll trust you. How many did you bring?"

"Twelve."

"You're in luck. The price just happens to be twelve gold pieces."

"But I'm the first Time Traveler!"

"Eleven. It's my final offer."

I accepted.

"Have Anne give you a receipt at the door. Oh, and don't let her sell you my copy of Holinshed. They all fall for that."

"Please," I begged, "will you return with me to the twenty-first century?"

"Sorry, never travel before the twenty-fourth if I can help it."

I could see there was nothing left for me to do. I turned to leave, a broken shell.

POP! Wha—!?

A man stepped out of nothing, holding what appeared to be an annoyed octopus. He stuck a tentacle in my face.

"That's right, look into the trivid, that's a good Timey. Pevlik, System News Syndic, twenty-third century. Would you mind answering a few—"

POP!

"Here he is. My, you've given me a chase. Astor, *Galactic Globe*. Tell me, what is your impression of—"

POP!

"Stanik, *Centauri Sentinel*—"

POP! POP!

"Hey! You!"

POP! POP! POP!

"Stilgrin, *Filbert Studge Stationer!*"

POP! POP! POP! POP! POP!

Ten, fifteen, twenty assorted humanoids suddenly surrounded me. I felt faint, dizzy, dazed. I could hardly breathe.

"Let me out of here! What's going on?"

"Don't you know?" asked someone with purple hair.

"Know what?"

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In unison: "You're the first Time Traveler!"

Everything began to fade as I sank to my knees. No, I thought, don't let it end this way.

"Zounds!" shouted a familiar voice. "By Gis and by Saint Charity, give the man air."

"Aw, come on, Will, give us a break," said one of the reporters.

"That I will. Doubt that the stars are fire, but never doubt that old Shaxpur would ever forget the people that made him famous. I know you want exclusives on the first Time Traveler, and I promise you, speaking as the lad's business manager—"

"My what?" I shouted. "A second ago you were ushering—"

"In the words of another Immortal Bard, 'It's raining soup, grab a bucket!' You want to make a little cash on this thing? These guys'll steal you blind if you let them."

"And you?"

He tried unsuccessfully to look hurt.

"I'd only take forty percent, no more than my fair share. It's only fitting I take care of you as my father took care of me."

"How much did he take?"

"Eighty percent till my twenty-first year."

"Good friend," I sighed, "For Jesus' sake waste no more time convincing me. Talk to them," I said, pointing at the mob, "and soon," I added. "I think they're getting hungry."

"Right away, boss. Who'll start the bidding for the interview. The man in the front offers three Asimovs and an Ellison. Who'll add a Brunner?"

THIRD ANSWER TO TANYA TACKLES TOPOLOGY
(from page 88)

The problem is not solvable on a sphere's surface. Assume there is a solution, and that the sphere is a rubber sheet. Puncture it at any point not on a line of the figure or on the line that solves the puzzle. The punctured sphere can now be stretched to make a plane surface. Since this stretching does not alter the topological properties of the figure, it would produce a solution on the plane. As we have seen, however, there is no solution on the plane. Consequently there cannot be a solution on the sphere.

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THE SPECTACLES OF JORGE LUIS BORGES

by Arthur Jean Cox

art: Alex Schomburg

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Arthur Jean Cox has devoted most of his fiction writing efforts to short stories—of which the present story is (he thinks) a fair example; but he is now at work on, and has almost finished the first of, two related boys' books, The Story-Teller's Stone *and* The Treasure of Summer, *which he says are "chock-full of adventure, science fiction, and fantasy." He is also the textual editor of a new edition of* The Mystery of Edwin Drood *by Charles Dickens.*

There was once a young man—there really was—who lived in a second floor room in a decaying old house on Bixel Street in Los Angeles. One summer afternoon he was interrupted by a knock at the door. I say "interrupted" because he was at that moment engaged in a favorite pastime of his: "going through" his collection of science fiction magazines, which he was doing, as he always did, with something of the discriminating delight of the connoisseur and something of the half-suppressed, almost anxious relish of a miser. He had the magazines spread out chronologically on his bed, the oldest, to the extreme left, being the January 1930 issue of *Astounding Stories*, the latest being the current issue of what was actually the same magazine, although almost unrecognizably so, and which he had purchased yesterday for a quarter. It was dated September 1948.

The door was opened immediately by the knocker himself (for the residents of Mother Russia's rooming house didn't stand much on ceremony with each other) and stood revealed, not as William Ellsworth or Stanny Farber, whom he was more or less expecting—he was always more or less expecting them—but as Mr. Waters, Mother Russia's man-of-all-work about the house.

"Got something here I thought you might like to see," said Mr. Waters. And, sure enough, he was holding something in his hands, which were trembling very badly, as if this were an occasion of some moment—but then, his hands always trembled very badly, Mr. Waters being older than the house he kept in repair and even more in need of repair himself. "*Anteojos,*" he explained, somewhat cryptically, gesturing with the object, which seemed to be an artifact of glass, metal, and plastic. "*Un amigo*—you know: a friend—in Argentina sent them to me."

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He held 'them' out and our young man trustingly took whatever they were into his own hand and found them to be a pair of spectacles. They were rather curious in appearance. They had horn rims, golden brown and translucent, like the shells (as he fancied, on the basis of no authority whatever) of certain marine animals. The lenses had an antique shape, being long and narrow, though not quite rectangular. They were remarkably clear, so clear that he at first thought there were no lenses and tried to poke his finger through one of them. But, in addition to these invisible lenses properly and conventionally placed, there were three pairs of other lenses poised upright on common pivots to each side of the front of the frame (surely you can visualize that), poised, he thought, like dragonfly wings, bursting from a chrysalis. They too were remarkably clear and each seemed to be connected with its twin on the other side by silvery wires traversely threading the translucent horn. He of course recognized this arrangement of auxillary lenses as some amateur inventor's crankish or humorous contrivance.

"Yes. . . they're certainly odd-looking."

"Ah! that's nothing!" responded Mr. Waters, with his usual explosive energy. "Never mind what they look like! It's the looking *through* them that counts! The great thing about these glasses is: *they enable you to see things as they really are.*"

The young man smiled. He had had some experience with Mr. Waters' bantering and perhaps slightly senile talk. But, to humor the old man and to satisfy his own curiosity, he put on the glasses and looked around the room.

Damn! It was true; he *did* need glasses, like Stanny had said. He didn't want them, he couldn't afford them, but he must need them, for he saw now that he had been going about without seeing things clearly, without seeing them in focus. That's why he hadn't realized how very shabby his room was. Now he could see that the pink bedspread was decomposing into lint, that the rug was threadbare, and that several generations of Pepsi-Cola bottles had left ghostly rings on the oak table to his right. The table (which had been scarred for life by some former tenant who had carved Wimpy's profile onto it) was also very dusty; but then the whole place was dusty, especially the darkwood cabinet that usually housed his collection. And that corduroy easy chair in the alcove—my God! How black it was where Ellsworth habitually leaned his greasy head. What a damp protrusion the wash-basin in the corner was! And that mirror—it was so streaked and

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clouded that even if the room were clean, it would be reflected as dirty. What a place to live! But how could a guy who was a store-clerk in a department store at 75¢ an hour afford anything better? What a life his was! Oh, well . . . he was alive, at least. He supposed that counted for something. And young; not like . . . not like the stagnant Waters here. He had somehow never noticed how horribly liver-spotted the guy was. He was old. He was standing over the very edge of the grave, the brown earth crumbling beneath his projecting toes and dribbling into the dark trough. . . and he knew it. He knew he hadn't long to live and his energy and jolly talk were a desperate denial of despair. The young man, looking at the old, felt a faintly queasy horror. . . for this, he saw, was what was waiting for him—*if he were lucky.* This is what the future, the horrible future, held in store.

Mortified, congealed, he averted his eyes, looked at the only other thing of plausible interest in the room, the magazines littering the bed. And seeing them now, with his sharpened vision and in the uncompromising light from the window, he was struck by how frayed the covers were and by the generally ragged appearance of those sheafs of pulp paper. Pulp paper? Waste paper, some people would say. . . people such as his parents and just about every older person he knew. He had always uneasily affected to despise their opinion, but now he was enbarrassedly conscious of the light in which any ordinary person would see the magazines. Any ordinary. . . ? Well, okay, let's say it, then: as any *normal* person would seem them. Cheap pulp-paper products, each costing anywhere from a nickel to twenty-five cents, sporting inanely fantastic covers and stuffed with stories read mostly by kids but made up by grown men who wrote them for a penny a word, or thereabouts. Oh, he knew all about that. He had met a few of those men across the street at the science fiction club he belonged to: men who wore wrinkled suits to the meetings and went home afterwards on the streetcar; men who not only wrote science fiction and fantasy but also westerns, love stories, sports and mysteries, even true confessions, often caring no more for the science fiction (as he had once or twice chillingly made out) than for the other stuff; men who looked at each other and smiled when he expressed his enthusiasm, a trifle gushingly perhaps, for their stories. Well. . . okay, they should know about what their stories were worth: they were in the kitchen when the stories were cooked up. If they didn't think science fiction was all that special, why should he? Why, in fact, had he ever thought it was?

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But he knew the answer to that question, really. It was because he had this craving for the fantastic, for some cheap escape, any escape, from Reality. He saw now that that had been a weakness of his from his earliest years. If he had been more interested in practical things than in reading and day-dreaming, he wouldn't now be living in a place like this. How could he have been so blind? He ruefully shook his head. . . and, doing so, became conscious of the weight of that silly Rube Goldberg contraption on his face. These damned glasses! What was it this decaying and demented old man had said? "They enable you to see things as they really are." Hah! The old guy had been right about that, in one sense, hadn't he? Oh, well. . .

He reached up to take off the glasses, touched the frame; there was a *click*! and he was startled when a pair of the other lenses fell into place—that is, dropped down in front of the fixed pair. He laughed, because of the little start he had made, and glanced apologetically at the old man. . . who beamed good-humoredly, as always. He might be a little decayed, but he was a good old soul, wasn't he? And he certainly *seemed* to be enjoying life. More than that—he was positively sunny. Perhaps he wasn't so much afraid of death as simply indifferent to it? Perhaps he had relinquished all ambitions and strivings and had relaxed into life, into pure enjoyment of. . . what were they called? . . . Oh, yes: his Golden Years. That was it. He rather liked the old guy, really. He had always enjoyed talking to him because he was so full of anecdotes and esoteric information. He had not only lived longer than most men, but more adventurously. He had directed two-reel comedies in the 1910s; he had barnstormed across the country in an old bi-plane in the '20s; he had drunk beer with W.C. Fields, and, decades before, had met Lillian Russell at a garden party held at the back of this very house when it was a stately mansion.

Rather relieved by this fresh perception of the old man's well-being, the younger glanced around the room again and saw, not exactly for the first time but more vividly than in a long time, what a very pleasant room it was. It was a corner room, with four windows. Three were in a semi-circular alcove to his right and were, as he had often thought, like the stern-windows of a brigantine; they were wide open and their lace curtains were billowing gracefully inward in the breeze. The fourth window was a large one, directly over the bed and facing west. Through it streamed a strong but mellow light from the four o'clock sun, so that the whole room was brimming with sunshine, and there

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welled up within him too, as he looked about, an answering glow. Suppose the room were a little dirty—so what? He could clean it up. He noted now some things he hadn't counted in his former inventory: the ivy wreath painted around the borders of the ceiling by a former tenant, an artist, in lieu of rent; the victrola cabinet artfully concealing the two-burner stove; the speaking-tube beside the mirror, once used to summon the servants, now hoarse with dust but not quite choked—if you spoke into it, loudly, in the dead of night and then waited, listening, you would presently hear the stairs creak in an ominous, spectral way... beneath the slippered bulk of Mrs. Russell, otherwise known as Mother Russia, who habitually sat and slept in what used to be the servant's pantry and was laboriously ascending the steps to investigate the unwonted summons.

But now Mother Russia was not to be heard . . . unless Ellsworth was right and it *was* she who was "The Phantom Pianist of Tendril Towers," for there came from somewhere at the back of the house the sound of a piano playing (of all things!) "I'm Sitting on Top of the World." It made him smile; and, still smiling, he turned his eyes to the window and glanced over as much of the world as he could see. That consisted mostly of Bixel Street, but that was all right, too. Directly opposite was the wooden frame house where Stanny Farber and a half-dozen other college students were camping in Bohemian squalor. To its left was the Old Trent Hotel, where his friend William Ellsworth kept a room, or, more accurately, a den, a sanctuary, an embryo museum; and to its right the Shangri-La, where a yet-surviving chapter of the old *Wonder Stories*-sponsored Science Fiction League still held its Thursday evening meetings in a ground floor (concrete floored) clubroom, a dear, familiar, homely place, small and cozy, cluttered with folding metal chairs, old books and magazines, and redolent of mimeograph ink; in its goodly window the impressive club insignia and vaunting motto: *Ad astra per aspera.*

And the sunlight streaming in through the wide window fell generously upon the glittering horde of magazines displayed upon the bed. The covers glowed with bright reds, blues, and yellows; covers by Wesso and Dold, who were his favorites, and by Howard V. Brown, Morey, Bok, Finlay, Paul, Schomburg, and Hubert Rogers. What other form of fiction had attracted such wonderful artists? None, and small wonder! For what other form of fiction gave such a license to imagination? That was the key word: *Imagination!* The being brought into touch with cosmos and eon-

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spanning conceptions, with predictions of the future (the glorious future!), and depictions of life on other planets. Who could fail to be thrilled by such things? Only those whose imaginations were flattened and staled by habit and routine or who'd never had any to begin with, those persons whose entertainment was "the news."

But here, he thought, his eyes eargerly seeking examples among the strewn riches, was the most delicious, the most intensely exciting fiction possible. Here was Campbell's "Who Goes There?" with its stunning premise, so beautifully, so treacherously, worked out. Here was A. E. van Vogt's powerful first story, "Black Destroyer," unforgettably establishing at one stroke his characteristic style and atmosphere. Here was the touchingly tender "Farewell to the Master" by Harry Bates, with its staggering last line. Here was Asimov's "Nightfall," the story of a people on whom the stars shine only once in a thousand years. And here too was Heinlein's "Universe"—if he were asked to point to a story at the very center of science fiction, this would be it. But there were so many fine stories—stories by Lovecraft, C. L. Moore, David H. Keller, E. E. Smith . . . Hah! Come to think of it (catching a glimpse of Rogers' cover for Smith's *Second Stage Lensmen*), he was a 'Second Stage Lensman' himself.

And in his amusement at this thought, he lightly, indicatively, touched the glasses. There was another sharp, decisive *click*! as the second pair of extra lenses dropped down into place: a precise, almost a prim, little sound that had a decidedly sobering effect. . . for it brought him back to himself and made him conscious of how unaccountably, how absurdly, exhilarated he must have seemed to Mr. Waters. What had the old guy thought of that sudden welling-up of elation in him? His eyes and hands had danced, hadn't they? His feet, too, they had danced, though in place—he knew they had. His hands and feet were still now, and his eyes, behind those triple lenses (accumulatively thicker than those worn in the movie by Dr. Cyclops) asked the question of the old man, "What in the world did you think?" and received in answer an enigmatic smile: not a derisive smile, surely, but there was something in it that the young man couldn't quite name. He knew only that it was a sad and funny smile, a kind of general comment, he supposed, on life . . . something along the lines, perhaps, of "Yes, I am touched by your playfulness and love of fantasy—no one more than I, who know how serious life can be." He was right, of course. Life *was* a serious thing. How could it not be? For the world—and he again turned his gaze out the

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window—for the world was not only a playground, it was also a battlefield.

And this time he looked out beyond the narrow street to the whole city, bristling with palms. Looked farther that that, perhaps. He could almost believe, as he peered telescopically through these triple lenses into the middle and far distances, that he could see the wide prospect of the entire continent, could catch glimpses here and there of its multitudinous, unceasing activities. It was as if he could see men felling the forests, farming the land, delving into the earth; could see planes soaring through the skies to New York and Chicago, trains dividing the prairies, the oceans swarming with ships: the whole stirring panorama of a world at work. And there reached his ear simultaneously through the open windows in the corner, various local background sounds that blended well with that visionary montage: the cough, purr, and roar of car motors, the honks of horns, the excited shout of the newsboy at the corner of Sixth and Bixel, the rattling of a trolley-car on its iron way downtown . . . and he could hear from behind him, in the depths of the house, the unseen pianist playing a march by John Philip Sousa.

He felt a sudden surge of confidence, a delightful sense of purpose, however undefined, a readiness for work or struggle, a latent energy such as a dragonfly, newly emerged from its chrysalis, must feel. He stood on tiptoes, not to dance, but in his eagerness to move forward and come to grips with . . . whatever presented itself, no matter what. There was a world waiting for him out there, a world where there were challenges to be met, and problems to be solved, and he felt equal to them all . . . or, anyway, ready to be tested by them all. "*Ad astra per aspera.*" "To the stars through hard ways." Of course. How else were we to reach them? The dream was necessary, but so was the work. Work without a dream was mere drudgery, but a dream without work was—what?—an idle fiction, a fantasy, a . . .

He sank back onto his heels, withdrew his armed vision from the world. His eyes sank, with a downward movement of sceptical anticipation to the magazines resting on the bed, those magazines whose striking covers had so thrilled him shortly before. Looking at them now, seriously, he saw how the artists had too often resorted, as a matter of general policy, to the most obvious appeal, and saw too that there were individual faults not compatible, as he supposed, with the highest standards. Bok's style was not "derived" from that of Maxfield Parrish—it was copied from it,

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and it had been coarsened in the transition. Finlay's glossily handsome men and nude women, frivolously embellished with bubbles, seemed to have been traced from movie stills and photographs in advertisements. Morey's drawing was so feeble, his colors so dull, his overall conception so listless, that one inevitably diagnosed a pathological enervation in the artist. And as for the pioneering Paul, here was not the touch, but the heavy hand of conscious and unconscious buffoonery.

But were the stories these men illustrated, or failed to illustrate, any better? Probably not. They were too often too hastily told, the make-shift contrivances of . . . well, perhaps, not desperate men, but men in too much of a hurry. None of them would bear close inspection. Consider, as instances, those embarrassing pseudo-poetic touches in "Who Goes There?" the slovenly inconsistency of detail in "Farewell to the Master," the failure of "Universe" to dramatically realize its promising metaphysical theme, and the basic psychological absurdity of "Nightfall"—a human race that never closed its eyes. He had been, while reading the stories, only irrelevantly conscious, so to speak, of those faults, but now, glancing back a little way, he saw them plainly; but, doing so, he felt no sense of disillusionment but, rather, that cool unwilled certainty that accompanies true insight. It wasn't that he didn't "see" the stories, but that he saw through them. A few minutes ago they had been irridescent; now they were transparent. What a field it was in which such stories were regarded as "classics!" And yet they *were* the classics, and justly so, for it was they that sketched out the most daring ideas in the broadest and boldest strokes. The stories were built on ideas, but the word for them was not, after all, "imagination." No, imagination was precisely what they were deficient in—how that judgement would astonish Ellsworth! The stories were insufficiently speculative, they did not illuminate life, they did not clarify or criticize life. In short, they were not serious; and he—*he* was serious. He felt a hunger for something nourishing and substantial, a need for something to come to grips with. There must be something in the way of writing that would speak *to* him and *for* him, something at once realistic and speculative, something concerned with his actual life and yet not narrow. Such books existed. He knew they existed. He knew their titles, had looked into some of them, but, looking around now, he saw none of them on the stacked orange and apple crates that served as his bookshelves, found there no copies of *Emma, Little Dorrit, The*

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Brothers Karamazov, Middlemarch, War and Peace, Remembrance of Things Past, Ulysses, found there nothing but some science fiction and mystery paperbacks, insufficiently satisfying. Surely, life was too short to spend much time reading such stuff.

And as his vision panned about the room, examining the magazines and books and furnishings (he was conscious of how uninspired the design of the bedspread was: it was worthy of Morey), it came back to Mr. Waters, who was still watching him with that wistful, that enigmatic, expression. A trifle wistful himself, and more than a bit sobered, he reached up to take off the glasses to hand them back to the old man. . . .

There was a *click*! as his fingers touched the frame and the last pair of lenses dropped down into place.

This time he did not start. But there shot through him, like an arrow from Apollo's bow (his own spontaneous simile) the question: *"What more can there be?"* What more, indeed? He looked around the room for an answer and saw the room from a curiously doubled perspective, as if he were at once far away and close up. He was distant, he was *very* distant, but the quadruple-lenses brought him close. So might one of Wells's Martians have studied the Earth. And he saw all the homely things about him now as if for the first time. . . or the last. Every commonplace prop and makeshift article in the room manifested itself with that poignant significance it would have had for him if this were the Last Hour. The wash-basin had the quiet dignity of a still-life. The mirror was profoundly reflective. The very easy chair in the corner was apocalyptic.

He was saddened. . . . No, he wasn't—he was serene. That's right. His spirit was as clear and as mellow as the light streaming through the window from that nearest star, a light that was slowly crawling up the back wall as the planet turned in another of its endless revolutions. . . crawling slowly, like that first adventurous amphibian crawling up out of the sea such a long while ago. Was it really such a long while ago? No. Looking backward, past the victrola cabinet and down the dwindling retrospect of the ages, he saw that heroic little speck working its way upon the abrasive shore. Heroic, yes . . . but his eye was more taken with the brilliant spectacle of lengendary heroes, supernatural beings and gods (two or three of these last towering to awesome heights) with which the progeny of that amphibian had strewn the intervening ground. And here, nearer on, he saw the heroes disbanding, the fantastic creatures vanishing into the woods, the gods floating

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away on their tinted clouds (the larger diffusing like clouds and leaving not a wrack behind), and saw Mankind striding bravely on alone, its step lengthening to the noble cadences of philosophy and science: striding towards him—upon him—past him.

He turned and looked in the direction Mankind was going, looked upward past and through the corner of the room over the bed. He saw cities rising distantly, tower beyond tower, into the sky, saw the towers connected by aerial roadways with flying machines of curious designs darting among them. And his eyes, straining to see farther and farther along the dim aeons, saw what at first appeared to be clusters of tiny golden fruit, but which his quickening sight made out to be the hairless skulls of the big-headed men and women who would inhabit the Ultimate Future, the glorious (if somewhat grotesque) Twilight of the human race; made out also that he was seeing the backs of their heads, for all were looking away from him towards that Night, which even then, was many millions of years farther on. But as he watched, he saw these heads, which had been bobbing and weaving and gently bumping together, gradually stilling and becoming fixed; saw them turning leftward, revolving slowly in concert, their eyes rotating into view . . . and saw those eyes all focussing in unison, all looking back down the blue-grey corridors of Time . . . at him.

Abashed, he averted his gaze, turned to what was nearest at hand: the magazines of his collection laid upon the bed like offerings upon an altar . . . and smiled. He felt a droll tenderness for them (and even for the bedspread they so largely eclipsed). What would he have been without them? Narrower than he was, perhaps. They had brought him into the only contact he had ever had with what was large, mysterious, and transcendental. They had made him acquainted with awe. They had aroused in him what had been called by someone—was it Sam Moskowitz? No: Henry James—"the blessed faculty of wonder." He saw them as limited, yes, as were all human things, but he saw also the aspiration behind them. And, really, at the distance at which he now stood from them, only the aspiration mattered: details of execution, whether of pen or pencil, were too small to be seen. True, they were merely aspirations; that is, they were merely dreams, and dreams of a sort that could not readily be put into the narrow way of action, but they were valuable for all that. They weren't useful, but they were sustaining—in much the same way as mythology, metaphysics, and theoretical science were

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sustaining to mankind at large. The Third-Stage Vision, the triple-lensed vision, was invigorating, a wholesome blessing bestowed upon the world . . . but perhaps even it didn't see the whole distance? "*Ad astra*"—yes, even if there were no ways, not even hard ones. It was the yearning that kept alive the spirit. And, besides, the magazines were such a large part of his life, a life for which he now felt, looking down and back as from some great height, a genial, fond, good-humored pity.

And now he understood that wistful and rather speculative tenderness on the face of Mr. Waters that had so puzzled him a few minutes ago. It was an expression very like his own, he supposed, for Mr. Waters had looked through these glasses at him, had viewed *him* from the perspective of Eternity . . . that is to say, humanly speaking, from the perspective of death. For, seen from this distance, there wasn't much difference between the two of them: the old man and the young one stood alike on the crumbling edge of the grave.

"Seen from this distance. . . ?" Strange. A small twinge of merely personal fear pulsed at the base of his lofty and luminous vision. Or not so strange. He was, after all, so very distant from his own small life—and so very high up! To walk you had to see the ground immediately under your feet, and seeing with such lenses as these was like walking on stilts a mile high. Ah, but the view was so glorious! He had never seen so far or seen so much! He couldn't give it up, not just yet. The vantage-point was so magnificent, the perspective so exhilarating—an exhilaration not to be distinguished, perhaps, from the strains of Beethoven with which the occult pianist was now filling the house: resounding chords that throbbed in his chest and limbs. . . and in his head too, for that felt as if it were trying to expand, in emulation of his remote descendants.

Looking upward and outward, he could glimpse now the multitudinous worlds of the galaxy, worlds as numerous as the sands on the Red Sea shore and swarming with myriad forms of intelligent life; and he caught here and there the glint of silver ships darting among them like needles, trailing threads of fire. His eyes, fascinated, strove to see farther and ever farther into the trackless reaches of that Void that was no void but a dazzling spectacle of suns and planets. He saw Xtl sprawling motionless on the bosom of space. He saw Trantor and that world where it is always, or nearly always, day. He saw the world of the Metamorphs and that desolate world where Coeurl prowled. He

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saw the world of the Sarn Mothers and the world from whence came the Tharoo. But, tremendous as all these things were—these teeming planets, suns, comets, galaxies, incandescent clouds—he gradually began to make out (with what an indescribably heady sensation!) that they were themselves but the atoms of a still greater universe. And, peering intently upward, almost with a sense of being drawn headlong forward and upward, he began dimly to discern the outlines of that Colossal World . . . for the atoms that were the stars of this universe formed chairs, a table, a bed, bookcases made of what seemed to be orange crates, and one or two towering manlike shapes. . . .

But the remoteness and height of what he saw was suddenly dizzying and he reeled, dangerously. The stars dipped and swung around him, streaking and blurring against the darkness. The interstices of the sub-atomic universes gaped at his feet. His left foot slipped, scrabbled for purchase . . . but still he couldn't give it up, he couldn't relinquish that far-seeing vision. Swaying, he preserved as best he could his precarious balance while, with eyes bulging so that they seemed almost to touch the lenses, he stared upward: for those looming manlike shapes, luminous and vague, seemed about to resolve into clarity. His large head wobbled with giddiness and he put his hand to it to steady it. And with the familiar touch of his fingers, reminding him of his humanity, he was reminded too of something he would seem to have forgotten. . . .

And he slipped the glasses from his face.

It took him a moment or two to re-focus his eyes. And when he had done so, the young man handed the spectacles back to Mr. Waters, saying—with a smile but with his voice faltering a little: "Thank you. They're wonderful glasses. But, you know, these lenses only concentrate and magnify." This had been his saving thought, the recognition that he would be giving up nothing, really. "The naked human eye is capable of all four kinds of vision, isn't it?. . . even if only fragmentarily and imperfectly."

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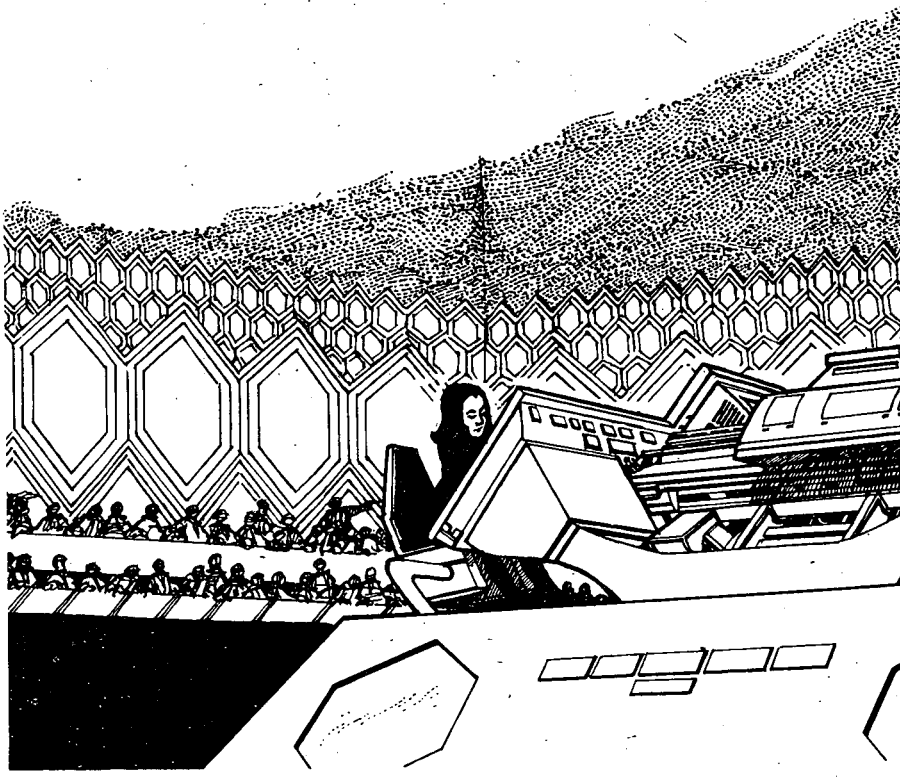
ON THE SHADOW OF A PHOSPHOR SHEEN

by William F. Wu
art: Derek Carter



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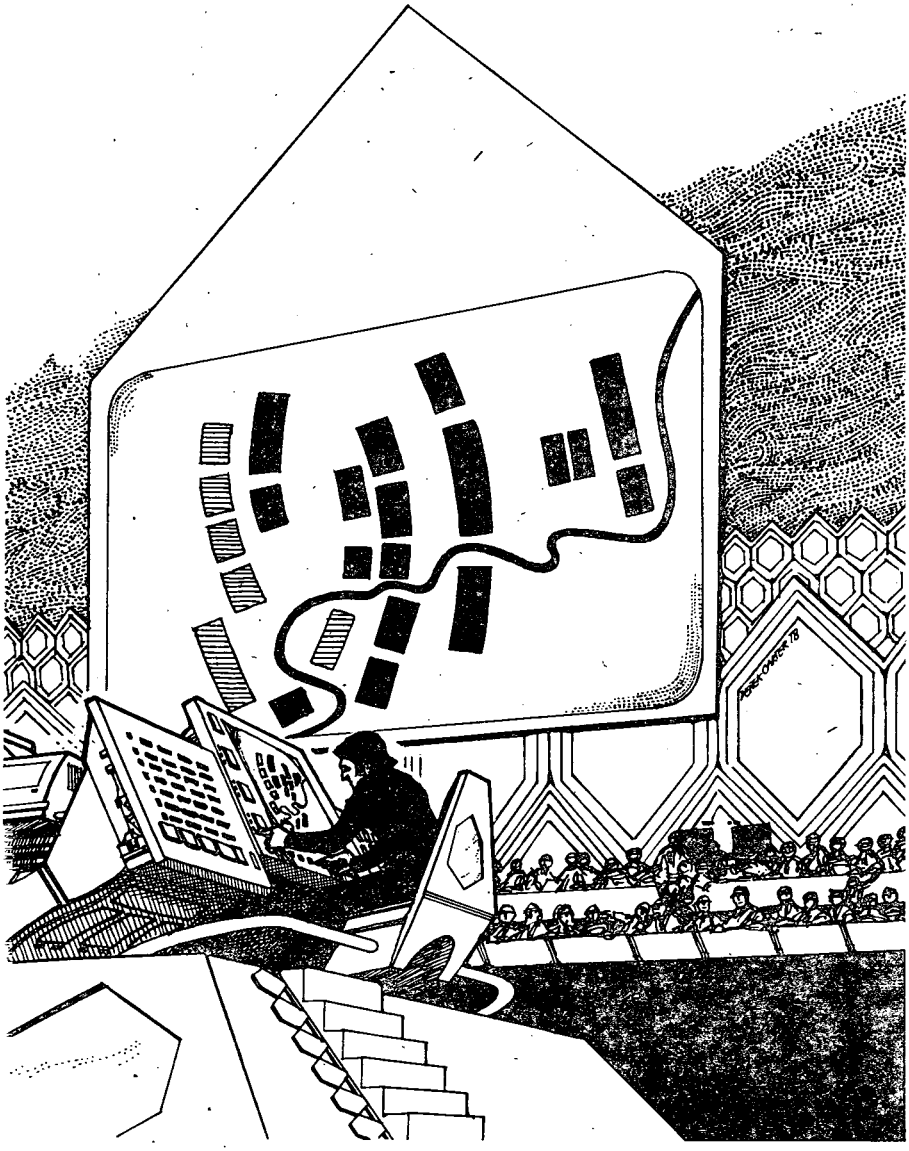

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Mr. Wu is still another member of the Ann Arbor writing horde; he's 27 and a grad student at the University of Michigan, where he teaches Asian-American history and literature and is writing a dissertation on American popular fiction. Although this is his first sale to a U.S. publication, he's sold twice in the United Kingdom and once in Japan.

Simulation Simulacrum. Simultaneity.
Similarity. Similitude. Simile.

The silent hall was cold. From behind walnut walls, the air conditioner hummed quietly. A stately crowd of spectators radiated bristling energy from the rigid square rows of seats. They sat against the walls, their attention fixed on the dramatic events at the center of the room. Giant video screens high on each wall gave them the elegant details.

The heavy brown drapes and plush burgundy carpet absorbed the excess vitality from the atmosphere. They imparted a dignified solemnity to the ritualistic proceedings and infused the imperatives of business with a sense of duty. Two huge cables hung from the ceiling, suspending old-fashioned horizontal fans with broad, lazy blades and globular white lights at their hubs.

Beneath the sleepy fans, Wendell Chong Wei repressed the surge of elation that threatened to rock his relentless control. He studied the video screen right before him, and his fingers danced on the console to maintain the non-stop pace. Victory should be certain now, but only if he remained clear of mistakes. He drew sharply on the depths of insecurity for a renewal of killer instinct.

On the other side of the complex, out of sight, his opponent sat before her own screen, drawing back her cavalry, hoping that Wendell would allow his own cavalry charges to over-extend themselves. No chance.

"*Remember, in reality the Seljuks actually circled, and* **took** *the*

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baggage and non-combatants. **Leave** *St. Giles there, even now. Curthose continues to rally well; Tancred's charges will carry the day. That's right—restraint. We're outnumbered; keep together."*

Richard nodded in the back of Wendell's mind and stopped talking. The smell of blood and dust and lathered horses arose to envelop Wendell's sensibility as he re-grouped the members of the First Crusade, now victorious at Doryleum on the road to Antioch. Frustrated, the Seljuk Turks remained on the horizon, taunting the Crusaders to break ranks.

Wendell refused. In the center of the screen, a digital clock appeared over the words "Victory Conditions, First Crusade. End game." The screen blanked.

St. Giles was dead once more. Bohemund was dead again. The Saracens and Crusaders had returned yet another time to their desiccated graves in the sand.

Wendell swallowed, and rose on weak knees to scattered clapping. His opponent, also looking infirm at the moment, stood and offered her hand without comment, and they shook perfunctorily. Wendell eased himself away from the chair, shaking, suddenly reeling in the sweat and nervousness that he always forgot in the heat of gaming itself. His twenty-nine years seemed far too few to account for this.

An attendant rushed over to escort him away.

"*Nice work,*" said Richard.

"Same to you," Wendell thought back. He wiped his palms on the sides of his chocolate-brown suit jacket. "But, uh, how did you know Robert Curthose could hold fast? In the middle of that retreat? His record's not so good, back in Normandy."

The attendant showed Wendell to a comfortable reception room with loungers and plenty of refreshments. When he had gone, Richard said, "*He really did that, you know.*"

"No, I didn't. But I learned to listen to you a long time ago."

"*More than that, though, it was deep in his psychological makeup. That's how I could count on it. If he—*"

The door opened, and Richard stopped. Wendell collapsed into a lounger. He despised receptions. People scared him. They scared Richard even worse. The ones entering now were the contractors for the two recent opponents, and his erstwhile opponent herself. The contractors were all bustling with talk and laughter. Wendell was too exhausted to tell them apart, and couldn't remember all their names anyway. His latent bitterness with the whole business kept him from caring.

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An older woman approached him, a contractor, with a thin face and a wide smile and lots of spangly jewelry and shiny clothes. Wendell shook her hand, but didn't get up from the lounger. He didn't hear what she said, either, though it registered with him as something good. After he had passed her off with some standard line, she glittered away to the refreshments and was followed by Wendell's recent counterpart in the act of artificial war.

"Have a seat," said Wendell, indicating another lounger. He could talk to another Master, he felt, who also shared the habit. "Good battle." He was still catching his breath.

She smiled and shook her head. Dark curls bobbed. "I thought for certain I could take your vanguard before the others drew up. Had them on the run at first, anyway. Who was it, the Duke of Normandy, who rallied for you? Just like he really did." She caught his eye and added, "The creep. I love it." Carefully, she eased back in the lounger and put up her feet.

Wendell nodded. "Robert II, Duke of Normandy." He smiled slightly at her enthusiasm. That had been the first crucial point, but as a Master, she knew that as well as he did. That was the pleasure of it—he didn't have to explain everything on the rare occasions that he talked to other Masters.

A large, fluffy white cat appeared suddenly on his companion's lap from the floor. She settled herself immediately on the dark blue slacks and treated the hand that went to her ears as a natural and proper development. Over her head, the two Masters lay back in their loungers, amiably re-hashing the game. Wendell's natural shyness evaporated quickly when the subject of talk was history or games. For them, as free-lance Gamers of the Master class, the battle was a matter of intellectual and artistic pride. The defeated party had no shame to bear unless the game had clearly exhibited poor performance—a condition that could apply to the victor as well. Odds were calculated for each side's units and degree of success; the contractors' dispute was based on the computation of these, not just on the apparent victory.

"I believe I played you once before, Master Wei," said his companion. "You don't remember me. I'm Terri Kief. In my first contracted game, we fought Zama."

Wendell hesitated, thinking back. "Oh—oh, yeah."

Terri laughed. "Your elephants rioted in the wrong direction—remember?"

"*Oh*, yes, of course." Wendell grinned. The game had been only his fourth. He had been soundly beaten, but at least he had man-

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euvered an orderly escape for his Carthaginians. That was more than the real Hannibal had done. "Very well fought, as I remember." Zama?

"202 B.C.," said Richard, in his head. *"Two years ago. I* **told** *you not to use those elephants, but, oh no, you—"*

"Power Technics won the right to a plant on the Big Muddy," Wendell recalled. "Isn't that what you won for them?" He was surprised that he remembered, but then, all of his thankfully few defeats, honorable as they were, stood out in his mind—as learning experiences, of course.

"Um—yes, that's what it was." Terri sat up, earnestly, steadying the cat with one hand. "I remember, right after that, you 'won' that draw at Bosworth Field for the Italian Bottling Co-operative." She smiled and twisted a curl of dark hair around one finger.

Wendell was flattered in turn that she knew. His own charge, Richard III, had been betrayed by crucial allies at the start of the battle. In reality, Henry Tudor of Richmond had taken a conclusive victory for the Lancastrians. With Wendell Wei in command, the Yorkists had exploited critical junctures between the three forces of Richmond and the two Stanleys, and had thrown the field into general confusion.

"A great deal of luck was involved," Wendell reminded her. "If my opponent hadn't been lax, it never would have been possible."

"Luck is part of things," said Terri. "Who cares? It happens, that's all."

"*Luck,*" Richard agreed, firmly. He had pointed this out frequently to Wendell, along with the admonition that their opponent had lost; they had not won. According to the rules, Wendell had not been allowed to prepare for the on-field treachery, since it had been a surprise in reality. But hindsight could go the other way. His opponent, while a Master also, had expected too much that history would repeat itself on its own, and he had been careless. Both sides had been forced to withdraw without establishing Victory Conditions, but Wendell's opponent had insisted upon conceding, stating that the position of the Yorkist cause at the time of betrayal had actually been desperate.

Wendell modestly, but truthfully, agreed that extricating Richard III from Bosworth had been his finest achievement, draw though it was. Even Richard, with his perfectionist standards, acknowledged its value in unguarded moments. The strength of the Gaming Masters' Guild made such dealings possible; no corpo-

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ration or other principal would object, for fear of being boycotted in later disputes.

"I'm afraid I'm rather ambitious," said Terri. "That Bosworth Field example of yours is just tremendous. I'm aiming at the number-one rating, and I've reviewed the tape of that game many times in the Guild Library."

"I had the undisputed number-one rating," Richard growled.

Wendell smiled at Terri. "You think I'm a textbook case, huh? Is that good or bad?"

"Well, I'm trying to learn from you. After all, you just beat me." She looked at him with amusement.

"Congratulations! To both of you." A hearty voice startled them. One of Wendell's contractors smiled broadly down at them, extending one hand and rattling an iced drink with the other. He was large and heavy, dressed in formal black. His tie was crooked. "A *fine* game. Saw it all on the spectator screens." He shook hands with them both, laughing happily.

Terri and Wendell thanked him. The big contracter stood beaming at them, sipping his drink. His name was Crandall, Wendell remembered, wishing he would leave. But the profession required courtesy toward contractors.

Crandall caught Wendell's eye and shook his head. "*Fine* battle," he insisted.

Terri nodded. "You know, there were times when I could have sworn you actually had the feel of the battle—you know, the ringing of hot steel, the beat of the hooves, the grip of old leather. I can do it sometimes in flashes—but not like that. You're amazing."

"That's me!" Richard cried gleefully. He was embarrassed and highly pleased. Wendell shook his head, smiling reluctantly. He thought back to Richard, "We have an unfair advantage, you know."

"Grand!" thundered the contractor. "Just what I wanted to hear. Listen, the two of you are close together, rated fifth and eighth Master Gamers. You care to work . . . together?"

"What!" Richard screamed with delight. Some word of this had gotten around, but it had been vague. No Master anywhere would pass up this chance.

Wendell and Terri turned attentive instantly. Crandall clearly enjoyed their excitement. "The new tandem game is ready," he said.

Wendell had already forgotten about the last contract—as a Master, he was always paid in advance, and the legal decisions he

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had won for his contractors were of no interest to him. The Guild demanded, and got, substantial rights of independence for its members. But the present games were devised only for one Gamer on a side. The computer bank already held incredible amounts of information—the terrain and weather of the real battles, the morale of the troops, their military capabilities, and the psychological profiles of all individuals that were on historical record. Minute technological details, such as the composition of stirrups and the age of leather, could win or lose battles. Four keyboards would square the intensity of the game, though increased caution might decrease the pace.

"Are you making a formal request?" Terri asked excitedly.

Crandall gave a long, sweeping, mock-formal bow. "I would hereby request the participation of the two of you in the first tandem game ever to take place, to be contracted through my office." He straightened up, grinning. "Howzat?"

Terri laughed and glanced at Wendell. "Excellent. I accept."

"Okay," said Wendell, smiling. Already, he was trying to absorb the implications of the new game.

"*Okay,*" Richard echoed happily.

Wendell's imagination soared, exploring the feel of the new game as it might turn out to be. Now, the Gamers only controlled two factors completely: they replaced the supreme commander in decision making, and had the advantage of aerial viewpoint over all the significant territory their troops could have seen. They were limited to reality in factors such as on-field communication, mobility, and availability of friendly forces. Lastly, "chance" factors were also included, to account for unexpected performances, good and bad, on the individual level. The games were good, but had never been constructed for team play before. The game would still be fast and intense, requiring that the Gamers keep their keyboards in constant activity.

When Wendell brought his attention back to the present, Crandall was pacing in front of them, talking loudly, and gesturing in all directions. The new game that the contractor described was essentially no different from the present games as far as playing technique except that the Gamers replaced two command individuals per side instead of one. The biggest changes were technological. However, the quality of the conflict would change greatly; no psychologically-programmed game-personality could ever approximate all the variations of mind that high stress evoked in a real person. This new game was a tremendous chal-

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lenge, and Wendell was anxious to try it.

"Sound decent?" Crandall puffed, lowering his arms. He stood bent over slightly, recovering from his high-pressure sales pitch.

"Of course it does," said Terri. She smiled and cocked her head to watch his face. It was red.

"Sure," said Wendell. He was watching Terri.

"*Right,*" said Richard. "*I guess we have a partner automatically, eh? No choice?*"

"She's a fine choice," Wendell thought to him. He knew her as an opponent, and that was the best test of her ability. She had won at Zama, after all. She had an unusual quickness, too, and in that first moment at the bell, when the Gamers found out which battle was to take place and which sides were assigned where and at what odds, decisiveness was crucial. Sixty seconds of orientation were allowed before the screen activated automatically. The computer chose battles and sides at random, and could choose grand match-ups or hopeless routs. Also, Wendell was envious of the short time she took to recover her strength after the game. He felt he needed a younger teammate like her.

Besides, he could talk to her.

Besides, Richard was nearly screaming with anticipation inside Wendell's brain.

At Crandall's assurance that the Guild had already approved the new game, Terri and Wendell agreed to try it the next morning, exchanging quick glances as they nodded. Elsewhere, the contractors with whom Crandall had a dispute were contacting other Masters. They, too, would be excited over the new development.

Wendell wanted to get away so that he could consult Richard without interruption, and excused himself from the reception early. His goodbye was awkward as always, but Terri congratulated him once more and said that she was looking forward to the new game.

Wendell left without speaking to most of the people. His shyness was generally interpreted as arrogance, and was notorious as such. However, lack of social grace was another indulged idiosyncracy of Master Gamers. He could get away with it, and he knew it.

"*Fancy game, huh?*" Richard crowed. "*Wonder what dispute they'll use the first one for—it'll have to be a big one. None of this, 'where do we put the fire hydrant, your yard or mine?'*" He laughed. "*We'll show the world—those slimy losers.*"

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"Yeah," said Wendell. He wondered who the opposing Masters would be—not that it would matter much. Still, with the World Headquarters here in the center of the country, it could literally be anyone in the Guild. The fact that he and Terri were both Americans was an off-chance occurrence; there were only six in the twenty highest-rated positions.

Wendell took a deep breath and glanced around. He had stepped out of the Crown Center Plaza, and, on a whim, decided to walk up Main for a while. He took off his suit coat and loosened his tie. The summer evening was humid, warm and damp, and the streets shone with the film of rainwater and oil.

"You heard what she said about me," Richard insisted. *'"The ringing of hot steel, the beat of the hooves, the grip of old leather.' That's what I provide, y'know."*

"I know." Wendell tried not to think, or else to think about trivia. At the moment, he didn't want Richard picking up his thoughts. Just how much Richard could read his mind, he wasn't sure, but a Master Gamer was cautious by nature. In any case, he couldn't read Richard's mind at all. He took a long breath, and caught the smell of rain lingering on the breeze.

"I **can** *give it, too,"* Richard went on. *"You know, I really think I have nearly as many important facts as those computers—not all, of course, that's impossible. But—well, you know how it was."*

"I know," said Wendell. He turned up a long institutional driveway, blotting out the visions of their childhood friendship that Richard had brought up. How it was.

"Technically, I suppose, we're illegal," Richard mused, *"there being two of us. Not that anybody'd believe it. Still, considering that—"* He stopped. The silence was dark and frigid and sudden.

Wendell sighed. "That's right," he thought to Richard.

No answer. There never was, on these visits. But Richard would have to come; that was one fact they had established. Their periods of consciousness and sleep coincided exactly, right down to brain-wave type and REM cycles. He had escaped one body, to be trapped in another, and, sometimes—lately, more than ever—Wendell took him back.

Wendell knew the way, and the hospital personnel recognized him and waved him on. The special ward, which was nearly a vault, lay in one of the underground floors, deep beneath the city. An orderly who knew Wendell escorted him to a cold, cavernous room in dim light. Coffin-sized tanks with a bluish tinge were

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lined up in long, lonely rows. Storage drawers or upright cases would have saved space, but they were too reminiscent of morgues and mummies. The orderly withdrew and Wendell, still feeling the icy silence in the back of his mind, stood over one of the tanks and looked through the transparent casing that covered its occupant.

The face, always lean, was nearly a skull. He wore only the steel headband and its attendant wires that monitored what little brain activity remained. The whitish cheeks showed faint gray spots where the synthetic blood picked its way through the sleeping capillaries. His wavy hair was the red-gold of the Celt, not the white gold of the Norse. Even now, the repose looked fitful—the face not quite relaxed, the limbs not quite comfortable. In other days and other places, the long legs would have worn a Highland kilt, and the bony, slender arms would have known a Lochaber axe, not the cold cushion of a suspension tank.

Richard had been the very best, even at age twenty.

The coma had begun nine years ago, and after four years, suspended animation had been suggested until further medical advances developed a way to induce recovery. It had been caused by those experimental helmets, in the only time they were ever used, and by Richard's own insane enthusiasm for the games. Without that waking obsession, he never would have invented the helmets, or induced Wendell to join him.

Burned out, Wendell thought—Richard had gone nova, after reaching the top in so few years. That was part of it, too.

The lilting spirit of a Burns melody forced its way through the frozen arteries. The wonder of Loch Ness lay flat under the realism of a phony death. Only the soul of Bannockburn leaped and roared, through the avenue of another person.

The helmets had been complex bio-feedback contraptions, keyed into the game machine, worn by both Gamers. Supposedly, they would monitor the stress on each Gamer in relation to each quick development on the screen. They were Richard's creation, an even greater monument to his involvement in the games than his youthful grip on the number-one rating. Richard was only a Master Gamer, though, and his dynamism in the field had fooled him. He had botched the electronics badly, and when the helmets jammed and buzzed and quivered with too much energy, the Gaming Master's Guild lost its number-one Master to a coma—apparently.

Richard wore a different kind of helmet now.

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When Wendell had awakened in the hospital, he had had company inside his own head. The emotional drive and the machine had become fused, and so had they. Richard had become the ghost of obsessed wargamers, the patron deity of electronic monomania, a scowling, blue-eyed, discorporate Guan Gung.

At first, the sharing of one body had been nearly unbearable for both of them—it wasn't exactly deliberate on Richard's part any more than on Wendell's, at least consciously. They grew accustomed to it surprisingly fast, once clear and detailed personal questions had established to each other that they were not crazy, after all. Gradually, if painfully, they adjusted to the situation. Their closeness as childhood companions helped immeasurably, as did their common aversion to social mixing and people in general.

Now the strain was growing.

Wendell gazed quietly. He was a Master Gamer now, an accomplished performer with a greater knowledge of his field than many military historians. Great civil decisions rode on his tides, and the Prairie Sector of the country followed. He was too young to remember the entry of the games into stalemated judicial disputes, though he had read about it later. The game sets had had only a few battles to choose from back then, though all had been classics. The technology was primitive.

And Wendell and Richard were two ostracized, introverted kids in an upstairs bedroom, setting up toy plastic knights. A carefully tumbled landscape of books, boxes, and blankets on the floor formed rugged peaks, treacherous valleys, and unscalable castle walls. Set aside, stacks of various histories provided countless scenarios and suggestions for their vivid visions.

"Okay," Richard announced, from his own side of the floor. He had his back to Wendell and was maneuvering nine thirteenth-century men in armor down the cascading folds of a blue blanket. "Mace-face is leading his puny band down into the valley now, sneaking up on the camp down there." Carefully, he lifted a large armored individual with an upraised mace, and knocked over a sentry with it.

"The Norman calvalry is having trouble," said Wendell, from his side of the room. He wheeled about seven toy knights, actually from the Wars of the Roses, and sent them into retreat. They didn't resemble Norman cavalry at all, but they did have horses and lances. "The Saxon shield-wall has held, and re-forms while the Normans re-group for another attack." He knew that Richard

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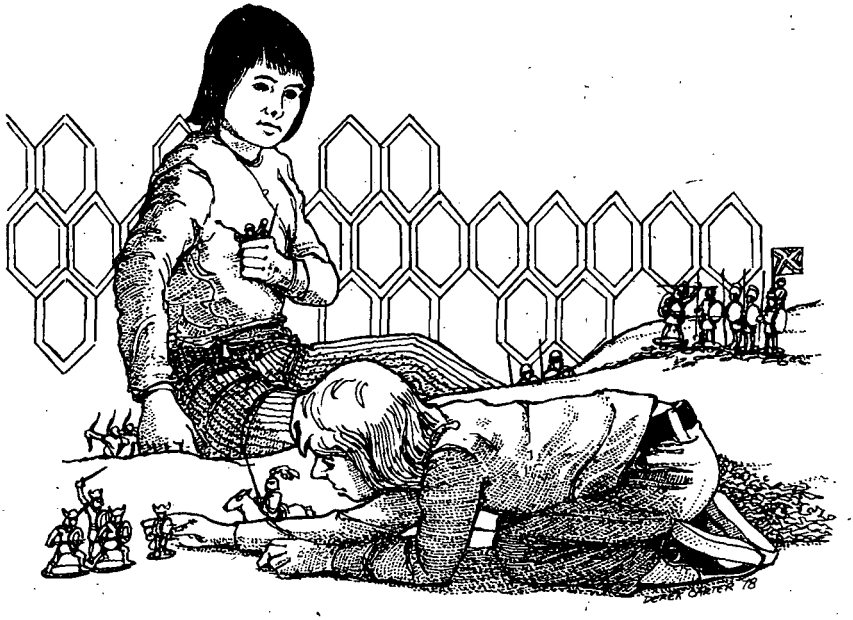

was listening with only the barest of attention, just as he was, but that didn't matter. This way, they could enact whatever battles and time periods and strategies they wanted. This included manipulating defeats into victories, and deciding on their own who would live or die. Both of them always won and the victories were always shared.

Richard sat back suddenly and considered. "All of these kinds of people were descended from Roman tradition—mixed up with the Franks and other barbarians, of course. I wonder what would have happened if some descendants of Carthage had lasted into medieval times."

"Yeah," said Wendell, without interest. He was trying to form a new shield-wall on the fold of a bedspread with nine Saxons and two temporarily-converted Vikings, who looked similar enough, but they all kept falling down.

"No good, I guess," Richard continued. "Even if Carthage had survived the Romans, the Vandals went through later anyway. So did the Arabs, too, in the 700s." His voice grew pedantic. "Jebel Āl-Tarik invaded Europe from Africa in 711—the easiest date to remember in all history."

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"Hm." Wendell tried to fix the name in his memory, to go with the date, but he didn't know how to spell it. He had never been as good with dates as Richard, but he had a better grasp of concurrent events and their inter-relation. Then Richard gave him an opening.

"I guess those Carthagians were doomed from the start," he said, and turned back to his half-completed battle.

"Carthaginians," Wendell corrected him.

Richard clenched his jaw and took on a firm look. "The city is Carthage—so, Carthagians, stupid. It's the easiest way to change it."

"I *read* 'Carthaginians' someplace," said Wendell. For them, the printed word was the last word.

"I presume," Richard said loftily, "that's C-A-R-T-H-A-G-I-N-I-A-N."

"Yep," said Wendell, thinking that Richard must be the only ten-year-old in the country who said "presume" out loud in sentences.

They looked at each other, and the undercurrent of childhood rivalry rose up in a mutual giggling ferocity that set them leaping at each other. Growling and yelling and laughing, they grappled and rolled in a narrow space of the floor that was still clear. Both were slender and limber, making them quick at close quarters. Richard had the reach, being considerably taller—and he looked thinner on account of it—but Wendell was more aggressive. As they rapidly approached their usual stalemate, someone's foot flicked into a battlefield and knocked over a few miniature stalwarts. Instantly, they both froze.

"Whose was it?" Richard panted, holding an awkward pose.

"Yours, I think." They untangled themselves gingerly and returned with extreme care to their battles. Fallen fighters were resurected, to be killed according to plan instead of by accident. Although their backs were turned to each other, they repaired the damage with a shared reverence, and in silence.

The insomnia that night was no worse than usual. In nine years as a Master, Wendell had never slept the night after any of his twenty-six games. Unlike some Masters he knew, he slept easily and soundly on the nights preceding games, and on every other night. But after the games, he lay on his back in his huge blackened bedroom, staring from his circular bed into the gloom. Coupled with silence, the darkness seemed to be a giant void.

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"I'm exhausted," Richard whined. *"Go to sleep. I can't stand this."*

"Me, too," thought Wendell, with effort. His arms and legs felt like inorganic weights, attached to his torso by straps. In the total darkness, and his complete weariness, his mind felt detached from his body and yet trapped in it—floating in his skull like a—like a body in a suspension tank. Or a specimen in formaldehyde.

"Go to sleep," Richard said again. *"I'm . . . tired."*

"Shut up," Wendell answered, without force. "What are you? You might . . . not even be there. Just another voice in my head."

"What! Of course I'm here. We figured that out a long—"

"Yeah, I know . . . but what if I *am* just crazy, huh? What if you're *not* there?" Wendell spoke in a spiritless monotone that largely disarmed the words. Vaguely, he wished he could be firmer. Or maybe a farmer.

Richard made a sound of annoyed muttering. Wendell blinked, or tried to. In the darkness, without moving anything but his eyelids, he wasn't sure if his eyes were open or closed. If he couldn't tell, then it could hardly matter. But he wondered. He always wondered.

"Stupid game . . . no people involved," Wendell thought. "All machinery. No . . . heart to it. circuits and moving lights. Dead. I should give it up . . . I hate it. It's empty, like, uh, my head." His tone lacked bitterness; even that required energy.

"If that's a joke, I resent it."

"Games. I've got games coming out of my ears. I haven't got any friends. I'm scared of them. All of them. Aiieee." He sighed inwardly. This was nothing new; the same thoughts went through his mind every sleepless, post-game night, after every urgent, killer-filled war game. He hated war, even his toy war. But he hated socializing more. The careful cultivation of a smooth, laconic speaking style camouflaged that fear, but it ruled his life.

For a moment, images of Terri rose up, laughing and talking with him earlier in the evening. Her hair bounced and swung as she moved. She looked at him when she smiled.

"Go to sleep," mumbled Richard.

Terri's face dissolved into blackness.

Wendell tried to blink again and see if he could tell. He stared at the darkness and gave up again. On the average, he supposed, he tried this ten or twelve times every sleepless night. If he ever reached a conclusion, he'd have to find something else to do. He tried it a third time. So tired.

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"Aw, c'mon. Can't you take a pill or something?" Richard always made the same complaints and asked the same questions on these nights. Why not? There was nothing else to do.

Fear—that was the true source of Richard's coma. Fear of life. Fear of human contact. Fear of doing something stupid. Fear had sent him diving into the world of the phosphorous shine.

Wendell understood it all, because he shared it. He lived his life inside the electronic game box, killing and re-killing people centuries dead, to flex his embryonic courage against other Masters—people who might be just as weird and anti-social as he, if not exactly in the same way. He wasn't sure, but he suspected that the Masters' Guild was another of the many refuges for loners, cowards, and repressed crazies. If one could handle the occupation, it paid better than bookkeeping, running projectors, wandering carnival crowds, and the rest. An occasional normal like Terri or Kirk Emerald preserved the staid image.

Someday he would quit. He certainly wouldn't want anyone ever re-playing his life, and improving upon it. How would Napoleon feel, seeing Wendell win Leipzig and Waterloo over and over again? It was a funny business.

The coma was a combination of electronic mishap and willful escape. Wendell had no idea how Richard's presence in his mind had really come about, but he was certain that some volition was involved in Richard's remaining there, even if it was all subconscious. Out of boredom, Wendell tried to imagine that he, motionless in the consuming black silence of his room, was also in a sort of trance. For a fleeting second, the escape had its attraction: no fears, no contests, and no irrevocability, like suicide. Then his physical exhaustion intruded upon his senses again, dissolving the respite. Not a trance, just old insomnia.

Until Crandall had mentioned the new tandem game that night, Wendell had hoped, guardedly, that their symbiotic relationship would reach an end soon. If Richard was as bored with it as he was, then the subconscious desire to maintain it would fade away. Now, the new game would bring another exciting dimension into their lives. And Wendell would never be able to request being left alone outright—not with his life-long fear of others making that same request to him.

If Richard could listen to these thoughts, he gave no sign.

Shrugging away his serious concerns, Wendell took a deep breath. Without intending to, he began to visualize his surroundings, somewhere out in the darkness. Then, amused, he began

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listing them in order from beyond his left ear, clockwise: alarm radio with voice-activated clock, set to light up when he gave the Clan Munro battle-cry in Gaelic; the controls to an elaborate sound system which was similarly started or stopped by listing the first three Plantagenet kings or the last three Capetians, respectively; a video desk and large television receiver whose channels were selected by the names of certain standard military procedures in Sun Tze's *Art of War*; a desk with a combined telephone and dictaphone set rendered usable from across the room by reciting any two of the major military contributions of the Mongol armies of Genghis Khan; a small movie projector which, unfortunately, had to be operated manually; last, floor-to-ceiling bookshelves, totally filled, which covered an entire wall. They were his instant references, the ones most needed or the ones most rarely in libraries.

"Don't do it," sighed Richard. *"There're too many."*

Wendell did his blinking routine again. Afterward, ignoring Richard, he began to list every book on the shelves by title, author, and major value to his own purposes. When he had finished, his review of the room was complete. He was tempted to force energy into his voice and mutter *"Caisteal Fòlais na Theine,"* at his clock, but he was afraid to know how early it still was. So tired. So dark.

The night had a long way to go. If he had been up, he would have activated his noise-making electric friends all at once, raising their volume in direct proportion to his loneliness. But now, in the darkness, in his weariness, he just lay there.

The foyer to Crandall's office was luxuriously furnished, and, ordinarily, both spacious and immaculate. Now, the new tandem machine, over twice the size of the old ones, stood in the center of the room, surrounded by the bright orange carpet. A coffee table and two easy chairs had been unceremoniously crowded into the far end of the room. The receptionist's desk had also been moved from its usual location, leaving deep impressions behind in the orange pile. The receptionist, stifling her annoyance, frowned at her papers and made a point of not looking up.

"Hot stuff," said Richard. *"Look at this place."*

"Quiet," thought Wendell. He swallowed nervously, anticipating the introductions.

"You know Master Emerald, of course," said Crandall, gesturing to a tall, well-dressed man at his side. The taller man was

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slender, with a full head of white hair and a slight tan.

"Of course." Wendell shook hands with him. Kirk Emerald was Director of the Trustees in the Gaming Masters' Guild. More than that, he was a co-developer of the original game machine and the acknowledged champion of the early contests. The games in the first several series of machines had been slow and studied compared to the current ones. As the games grew faster, the best players became the younger ones. Kirk Emerald had already been middle-aged when the game was developed, and quickly found his reflexes too slow for the later models. Still, he commanded tremendous respect.

"Master Wei," said Emerald, nodding slightly. "This is a fine game, here. I was fortunate enough to participate in the quality control games, and enjoyed them very much."

"Do you know Master Kief?" Wendell said. "We've played each other twice, most recently last night. So we're somewhat familiar with each other's playing style." Hopefully, that would be enough small talk.

"That's part of teamwork," said Terri. She smiled at Emerald. "We've met."

"Ah." Emerald bowed slightly and smiled in return. "I remember."

Crandall, who had been shifting back and forth impatiently on his feet, waved a hand at the machine. "Shall we?" He grinned eagerly.

Wendell and Terri moved around it warily, like visitors at a zoo. Wendell trailed his fingers over the chair backs, looking at the double consoles—two keyboards, two screens—on each side. He tried to imagine working elbow-to-elbow in a fast maneuver, where he had to predict the combined moves and weaknesses of three other players instead of one.

Inside his head, Richard whistled appreciation.

"I envy your opportunity," said Emerald, hesitating between the other two chairs. No one doubted his sincerity. "Shall we begin?"

"*What do you think?*" said Richard.

"No telling yet, of course," Wendell thought back. "Shut up." Aloud, he said, "I'm ready. Uh . . ." He looked from Emerald to Terri to Crandall.

Crandall took charge, putting a hand on Wendell's shoulder. "We'll take this side. Master Emerald, if you'll join Master Kief over there. Go easy, please," he added, laughing. "I can play, but I'm no Master."

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Wendell sat down and felt the keyboard. The seat, the board, and the screen were still the standardized equipment he was used to—an important detail. Crandall eased his bulk into the adjacent seat. He pushed a button and the screen read: "Cannae. 216 B.C. Roman Cavalry." Officers' names, Victory Conditions, and odds for the battle were given below. The adjacent screen would be saying, "Roman Infantry." The opposing screens were the same, except "Carthaginian" in nationality. All four players laughed politely.

"I figured we'd start easy," said Crandall, chuckling.

"*Coward,*" said Richard. "*Sniveller.*"

Wendell relaxed a little as he waited for the minute of orientation to go by. This was a classic confrontation, which needed no forced recall. Kirk Emerald had built it into the very first machine for the first game, and it had been fought many times over. Its choice by Crandall was a subtle tribute to the elderly player seated across from Wendell, out of sight. Wendell guessed also that seating Emerald on the winning side was no accident, either, but it was a harmless bit of protocol. In fact, Wendell was glad. Kirk Emerald was a reigning monarch, but in a society of combatants, that was a step down from the fighting ranks. Master Gamers had a keen sense of passing time, possibly from their concern over history—and every Master was well aware that the rarest future this occupation offered was aging with dignity. With perhaps five good years left, Wendell was growing more conscious of the small amenities.

The screen blinked once and began to move. Wendell's Roman Cavalry were crimson units, while Crandall's Roman Infantry were burgundy. The Carthaginians were two shades of yellow. Wendell's shyness fell away as he took control of his forces. He advanced his lines slowly; there was not much maneuvering possible. Much of the Carthaginian victory had been decided by a highly favorable field, and the Gamers could not change that.

"*Easy, that's it,*" said Richard. "*If we can avoid being routed, we'll be a step ahead. The only—*"

"Can it," Wendell thought. He was getting annoyed. "We both know this battle the same as each other's . . ." He trailed off uncomfortably. The subject of sameness had little meaning when they shared everything.

Crandall was taking the Roman Infantry forward to their doom with wanton joy. Wendell could see, out of the corner of his eye, Crandall's delighted grin as he shared a battle with three genuine

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Master Gamers. Every contractor was a Gamer at heart.

Terri obligingly allowed the Carthaginian center to sag in, as Hannibal had planned, until her flanks, anchored on hillsides, could turn and encircle the enemy. Wendell grinned at Crandall's light-hearted slaughter of his own units, as the two cavalry forces closed with each other.

"*What's Crandall doing? Is he crazy?*" Richard demanded. His voice had a righteous ring.

"He's just enjoying himself. Forget it." Wendell frowned and his fingers leaped about the keyboard. The screen responded just as it should, and the keys felt fine. For several moments he concentrated on the struggle at hand, testing more intricate aspects of the machine. He was off his game from lack of sleep, but he managed with no trouble.

Wendell noticed suddenly that he had been gaining an upper hand. Surprised, he tried an experimental feint and watched the opposing units over-shift in response. He hesitated.

"*C'mon, push the advantage.*" Richard was impatient. "*What's wrong with you?*"

Wendell turned his line slightly, exposing his flank. He could be a ruthless competitor, but not a cruel one. Emerald's reflexes were slow and his style rusty. Wendell could slice him to pieces and turn one of the greatest defeats of all time into something of a question. He found that he would not.

"*Stop it,*" screamed Richard. "*You malevolent fool. Are you retarded?*"

"Shut up," thought Wendell. He could not let his forces fall apart, for Emerald would see through that, and be even more embarrassed than if he were soundly defeated. Carefully, Wendell kept his resistance stiff, but allowed himself to be forced backward. He could not honor Emerald from this role, but he could avoid humiliating him.

Mercifully, Crandall's reckless advance brought about a quick end to the battle. The screen froze with "Victory Conditions, Carthage," and the elapsed time. Wendell took a deep breath and leaned back.

Crandall threw back his head and laughed. "Wonderful!" he declared. His receptionist, in a far corner, glanced up and smiled slightly. Terri slid out of her chair and watched Crandall with amusement.

"I'm afraid you were easy on me, Master." Emerald smiled at Wendell as they both stood.

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"No." Wendell shook his head, smiling back and then glancing at the other two. Crandall had probably not noticed the subtle change in the cavalry engagement, but Terri would have. "It's a good game, Master Emerald. I see no problems."

"Yes, I believe so. Lou, you have a certain, ah, flair for tactics."

Crandall grinned and turned his hands palm up. "I know when I'm licked."

"*He licked himself pretty good,*" Richard snarled.

Crandall stood, joining the others.

"The machine is fine," said Terri. "The battle didn't offer much real interplay, though. It was almost two separate battles. I was under the impression that the whole point was—"

"My fault," said Crandall quickly. "I should have chosen a battle that would utilize that area better. Most of the scenarios will fully engage each player with the activities of the other three, I assure you."

Wendell glanced nervously at Terri, wishing he had thought to raise the point.

"I can vouch for that," said Emerald. "In most cases, the game becomes as complex as anyone could want."

Terri nodded and caught Wendell's eye. He sort of shrugged.

"*How come his hair is never out of place?*" demanded Richard. "*Think he glues it?*"

Wendell glanced up at Emerald's full mane of white hair, flowing back with a mixture of precision and naturalness that matched his stylish clothes. "I like him," Wendell thought to Richard.

"*I hate him,*" Richard said firmly.

"I have contracts here," said Crandall, pulling them from his inside pocket. "The two of you may take and read them at leisure."

Emerald cleared his throat and looked at the floor, frowning.

"Three months away," said Wendell, glancing at the match date on the first page.

"Too short?" Crandall sounded concerned. "I know the usual is six months, but—"

"It's legal, all right," said Terri, nodding. She raised her eyebrows at him. "It's just, well, especially short when you consider that it's a completely new kind of game."

"I see," said Crandall. He made a jaw motion as though he were chewing a cigar. Then he glanced at Emerald.

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Emerald frowned more deeply. "I must tell you that we're on the threshold of something here. The. . . principals named on the contracts are actually representatives." He paused for effect. "In reality, the principals are the governments of Portugal and Yugoslavia."

"*Garbage,*" said Richard. "*Who cares?*"

"Shut up," thought Wendell.

"Wait a minute," said Terri, looking at Emerald. She stared for a moment, twirling a curl of dark hair on one finger. "Governments."

"Governments," Wendell repeated quietly. That was new.

Emerald nodded. "The true dispute is something small—some kind of mutual maritime rights. It's all in the contract, hidden behind dummy corporations. The real point is, that no governments have ever before agreed to abide by a decision of this type. Individuals and corporations and internal governmental decisions all over the world—of course. But no two national governments."

Terri's voice was tight with excitement. "And this could set a precedent."

"*Hmph,*" said Richard.

"It's all theoretical," Crandall put in, clearly enjoying Terri's interest. "But the Gaming Masters' Guild has a reputation for being selfish enough, cautious enough, international enough, and rich enough to be incorruptible. It's a start, at least, if matters hold up." He laughed and shrugged.

Wendell and Terri glanced at each other, grinning. A new challenge was rare for Masters in the top ten, and they had one with a double punch. Wendell thrust his hands in his pockets and looked from Terri to his feet.

"This will be the test case," said Emerald. "And the only item that could be a catch is the insistence of both governments that the dispute be decided by late autumn. Apparently it will affect their work in winter dry-dock."

"Under the circumstances," said Terri, "I think we can handle it in three months." She smiled and looked at Wendell.

"Yes, of course," he said. "But, uh, why did you wait?"

"To tell you?" Emerald smiled. "Naturally, I'll trust your discretion in all of the foregoing. We weren't allowed to contact anyone at all until the last details of the agreement were finalized, early yesterday. Since both of you played under a contract of Lou's, he knew you weren't signed for the future, and he pounced."

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"*Of course he knew we'd accept,*" Richard complained. "*Any Master would jump at the chance to play tandem. I despise this manipulation.*"

"I had you in mind for a long time," Crandall added. "The selection involved much more than availability, I assure you, though that was certainly important. Don't think I chose you at random. It was no accident." He let out a breath and looked around. "Are we set?"

Terri and Wendell both nodded. "We'll look over the contracts and be back tomorrow," said Wendell. "I expect no problems."

Terri nodded in agreement.

All four of them shook hands again, smiling all around. As the brief celebration ended, Kirk Emerald glanced wistfully at the game machine. "Anyone care to play again?" he asked.

The early weeks of preparation went quickly. The necessary rest sessions became the height of Wendell's day; time set aside for planning now offered conversation instead of rote memory work done in private. Before, he had always enjoyed the practice matches most out of the preparatory routine.

The elevator doors inside the Guild Hall opened into a heavily carpeted hallway. Wendell stepped from the elevator into an intricate, complex maze which offered thick, locked doors at intervals. These were the preparation rooms, where Masters would hone their skills for an upcoming game, normally by playing against the Guild Apprentices, or "spars." For the special tandem game, though, other Masters had agreed to act as spars for both teams. Wendell walked quickly, glancing at the door plates. Even after nine years, the maze sometimes still baffled him. He finally reached a door titled "*Dan no Ura,*" and sighed with relief.

"*Japan, by the western end of the Inland Sea,*" Richard recited. "*Year, 1185. Minamoto Clan eliminated Taira Clan.*"

Wendell used his borrowed key in the door. Every week, they changed their preparation room as well as their Master spars; this was to insure that opposing players would not accidentally identify each other through the pre-game routine. By custom, only the most functional and necessary conversation was carried out on this floor.

Inside the room, Terri greeted Wendell with a quiet smile. Away from the door, on the other side of the game machine, the two Master spars nodded at him. Wendell knew both of them by sight, but had never spoken with either. As soon as Wendell was

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settled at his console, Terri activated the game.

The screen read: "Ain Jalut, 1260 A.D. Ilkhan Mongols." Several names followed, and a list of Victory Conditions and odds. Wendell was the second-in-command, leading one wing of cavalry.

"*Hulagu,*" said Richard, identifying the Ilkhan himself. "*The Mongols, as always, have a totally mounted force. Important: up to this point, they are undefeated. Consider an over-confidence factor programmed into the game.*"

"Right. Terrain?"

"*Mm—inconsequential to an all-mounted contest. Open desert country, slightly rolling.*"

Wendell's fingers wiggled nervously over the keyboard as the minutes of orientation dragged by. This would be a rough one for him, demanding skill from his weak points. He felt like consulting Terri, but negotiations conducted through the contractors with the opposing team had produced the agreement that no talk would be allowed between partners. Speaking would eliminate the factor of on-field communication, which had always been important.

"*Opposition,*" said Richard. "*Victory by Mamluk Egypt, under Baibars. He himself is part Mongol and produces this first major trouncing of the Mongol army by utilizing their own style of war against them. Speed, surprise, mobility, discipline.*"

"Right." Wendell had all of this in him somewhere, but having it spoon-fed relieved him of both the pressure and energy of trying to recall it. He squirmed in his seat as the final seconds approached.

At least, the Mongol style of battle required a minimum of on-field communication. The general plan was discussed first, and the actual timing was co-ordinated as much by the judgement of the unit commanders as by conveying orders. Wendell and Terri, as any Masters, were prepared to utilize those plans and styles without discussion. In the last practice session, Terri and Wendell had commanded a loose confederation of Hindu forces at Tararori in 1192. Hamstrung by a disjointed command and strict Hindu religious laws, they had been easily over-run by Mohammed of Ghur. This clash, on the other hand, matched nearly identical fighting styles.

"*Go!*" screamed Richard.

The two sides closed fast and kept moving. Terri worked quickly and easily, setting up one side of a pincer movement. Wendell was ill at ease in the open, slash-and-run conflict. Re-

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peatedly out-maneuvered, he failed to bring about the second wing of the pincer. She was probably annoyed, he thought, as she re-consolidated her wing.

"*Back. Wheel about. Faster. No, faster.*" Richard's voice was quick and steady.

Wendell tried to set up a defensive posture, but the enemy's mobility on the open land could outflank any stand. "I'm still no good at this," he thought to Richard. Fleetingly, he remembered again: Richard was the undisputed number-one.

"*Attack. What are you waiting for? C'mon!*"

"Lemme alone," Wendell thought in a snarl. He brought his chaotic squads into reasonable order, trying to use Terri's more successful units as a buttress. She recognized the effort and helped with a long, sweeping charge which momentarily broke the enemy's pressure. The battle, made up of charges and sudden wheeling flights to re-group and charge again, rolled over wide areas of terrain, always moving. Lathered horses whinnied and screamed in the distant edges of Wendell's attention.

"*Stop trying defense,*" Richard said angrily. "*Cavalry is an offensive weapon, you know that. Take—*"

"Shut up," Wendell thought. He took two good swipes at the enemy flank, but then a concerted enemy charge separated him completely from Terri. A second later he was in full retreat.

"*Satisfied?*" Richard growled. Terri's force quickly collapsed under the undiluted assault from the other side. Still, her facility with this command remained obvious, even in defeat.

"Victory Conditions, Mamluk Egypt," came on the screen. The elapsed time was remarkably short, even for this kind of battle. All four players audibly relaxed and leaned back, their faces bathed in the phosphor sheen of their screens.

Wendell smiled weakly at Terri, who shrugged. He flexed his fingers and looked at the frozen screen, feeling anger rise inside him. Yet Richard had clearly been right in his advice. Well, after a short break, they would go at it again. Silence reigned in his mind, as neither he nor Richard would speak.

"Tell me," said Terri, smiling over the short candle between them. "Did you invite me out to dinner just to make up for that first loss this morning?" The yellow light flickered over her smooth cheeks. "You really didn't need to."

Wendell smiled shyly and stared into his empty bowl. "Oh, I dunno. I just felt like I should acknowledge it as my fault."

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"*You fool,*" said Richard.

Wendell tried to ignore him. He had not been in this sort of social situation before, with Richard. "Anyway, that type of fighting has always come hard for me."

Terri nodded. Her dark hair was almost lost in the dimness of the restaurant, but the candlelight shimmered on the curls around her face. "You're extremely tough defensively. The cavalry-to-cavalry attack just doesn't offer a stationary unit to work from."

"After this morning, I'm certain I've been lucky never to have fought Ain Jalut in a match. I did even worse than the real commander, and he lost badly."

"*You're not kidding,*" said Richard. "*Very lucky.*"

"*I* was the commander today, don't forget." Terri laughed. "If you had fought a match, you would have been playing solo, and that's much easier. I'm serious about your defensive instincts, though. We just have to mesh our abilities better."

"Oh, I agree." Wendell leaned an elbow on the table, then changed his mind and took it off. "You think on your feet very well—adapt and respond while in motion."

Terri laughed again. "That comes from growing up in Queens—it's my New York paranoia showing."

"Oh, I didn't know where you were from."

"I left there quite a few years ago. Where are you from?"

"Right here—born and raised."

"*Me, too,*" said Richard in a snide tone.

"Shut up," Wendell thought to him.

"Really?" said Terri.

"What?" Wendell blinked, in confusion.

Terri laughed and cocked her head to one side, studying him. "Aren't you paying attention? What's the matter?"

"I'm sorry. I—"

"*Yeah. Tell her what's the matter, why don't you?*"

"Stop it," Wendell thought back angrily, clenching his teeth.

"Wendell? Are you all right?" Terri brushed the curls from her eyes, frowning.

"Yes, I'm okay. Sorry." Wendell took a deep breath and tried to smile at her.

"*Getting kind of crowded here, isn't it?*"

Wendell controlled himself with tremendous effort. He could feel himself quivering. "It certainly is," he replied in his mind.

"No more personal questions," said Terri. "I promise."

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"Oh—no, it's not, uh, not that. I—"

"That's all right. I wanted to tell you more about Ain Jalut, anyway."

"You don't need to, it's okay." Wendell had been hoping for more personal questions, really.

"It's just that when we fought Zama and Doryleum, you used your cavalry very effectively against me. Ain Jalut was just a certain kind of problem. And now I'll change the subject."

Wendell laughed. "All right. But you routed my cavalry at Zama—don't deny it."

"Oh, all right." Terri paused to take a drink of water. "But talking about different kinds of battles, weren't you one of the ones playing when Master Cohn's practical joke appeared in a match?"

"Ha! I sure was." Wendell grinned. "He paid for it, though—a year's suspension, just for inserting a Moopsball program into the game banks."

"That must have been quite a shock, when you were all primed for a serious match."

"Yeah, but to tell you the truth, I would have been just as happy to go ahead and play." Wendell made a grim face and drummed on the table as though it were a keyboard.

"I think I would, too." Terri smiled looking into the candle, and her teeth flashed white in the flickering light. "We're more alike than you think."

"Uh . . . you think?" Wendell blinked again and met her eyes. They were bright blue, with a corona of yellow streaks radiating from the pupils. His felt bloodshot, and he chuckled at making the comparison.

"What's so funny, huh?"

"I'm just having a good time. Would you like any dessert?"

"Naw—too fattening."

She excused herself, and the candle flame fluttered as she rose. Wendell sat back and watched her go.

Late one afternoon, they strolled through the Crown Center shops, unwinding from a hard-fought practice victory over Ferghana by Han Dynasty China in 102 B.C. Exhilaration had leveled off to a general simmer of satisfaction. Their teamwork was beginning to jell.

Terri stopped in front of a window that held a back-to-school display. Pencils and notebooks were strewn all over the green carpet, while two giant cardboard children grinned ferociously in

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the background, marching arm-in-arm. They were wearing matching red plaid outfits, and clean white shirts.

"Ugly kids," said Terri. "Their heads are too big."

"You suppose those plaids are anything?" Wendell frowned at them, trying to remember if they were familiar.

"Oh, I doubt they're tartans. Probably just ordinary, modern plaids."

The next window offered rows and rows of hand-made ceramics. Most of them were variations of brown and gray, for the coming fall.

"Ferghana," said Terri. "The T'ang Dynasty horses, that were immortalized in ceramic work."

"Same color," Wendell agreed. He shook his head. "I wonder what knowing all this is good for."

"It's good for a Master," said Terri. "Not for much else, if that's what you mean."

"I guess I'm just feeling futile these days. Too much practicing, probably."

Terri looked at him. "You almost quit once, didn't you? A long time ago. I heard about it."

Wendell nodded. "A long time ago." After the experience with Richard and the disastrous helmets.

"He's still in a coma, isn't he? Your friend?"

"Yeah." Wendell looked at the floor. Richard's collapse had been big news, back when it had happened.

Terri pursed her lips, seeing that she had touched on a bad subject. She started to move on, then stopped.

Wendell was nodding to himself, staring at a brown pottery teapot. It seemed to have a faint Japanese flavor in its glazed design, but that might be an accident. "You ever consider quitting the Guild?" he asked abruptly, putting the thought into words before he had a chance to reconsider.

Terri looked up in surprise. "No, never. I mean until I have to on account of age, of course. Why, do you? Now?"

"Yeah, often—that is, whenever I win. I guess today it's from winning in practice session. I could never quit after losing; it'd have to be a victory."

Terri cocked her head to one side. "I see."

"Doesn't it ever seem odd that we keep re-living other people's lives, and killing them over and over? It's all such total fantasy. And kind of disrespectful to them."

Terri nodded. "Of course. It's just a game. Gaming Masters are

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some of the craziest fantasizers around. Isn't it obvious?"

"No," Wendell said slowly. "Maybe not to me. I knew it was true for me, but I guess I didn't think about how anyone else thought of it. It is disrespectful, though, don't you think? Kind of arrogant."

"We're all crazy that way. That doesn't mean it's serious."

"Yeah. Maybe." Wendell rocked on his heels, surveying the ceramics to avoid her eyes.

Terri slid her thumb under the strap of her shoulderbag and hoisted it. "Are you really serious about quitting?"

Wendell shrugged, still looking away. "I think if we score a victory, it'll be a good time. I'll be leaving at a sort of peak."

"I see." She studied him for a moment. "Well, you've been at this for a while longer than I have. I suppose, well, if you're sure you've had enough."

"I'm also afraid not to quit after a good victory—what if it's the last one, and I pass up the chance? I might *have* to go out in defeat, if I'm not careful." He glanced at her, sort of sideways.

Other doubts remained unspoken. If Richard was the best Master, and he advised Wendell, then was Wendell really any good at all? Would he win without Richard, the twenty-year-old prodigy? Or go down the drain?

Terri was silent a moment. "Okay," she said "Okay, Master Wei. We'll make this a huge victory, and send you out in style. All right?"

Wendell smiled self-consciously. "Uh, all right." He cleared his throat and glanced at the store window once more as they moved on.

"*All right,*" said Richard.

As the practice sessions progressed, one pattern became clear. The team could not work properly as a trio, not indefinitely, not even if Richard was the top of the field. The certainty grew in Wendell's mind that the official match itself would climax the entire situation. He suspected that Richard was somehow communicating the fact on a non-verbal level, but whatever the source, he accepted it. They conducted practice sessions with a grave civility between them which was more tense and calmly angry than even the silence, which now characterized nearly all the rest of the time.

Wendell's friendship with Terri bloomed quickly, watered by the familiar wasting of electronic blood. For the first time, now,

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he became less afraid that Richard's presence had been seriously warping his perceptions and relations with other people. Richard meanwhile went into a cold eclipse, only expressing himself with a mechanical precision during practice games that evinced a raw-nerved hostility.

On the night before the match, Wendell again slept deeply, without waking. Beside him, Terri stared fitfully into the blackness of his bedroom, trying to toss only very gently on the mattress. He noticed no movement, and did not stir at all. At one point, she raised herself up on one elbow to squint at the clock. She remembered Wendell telling her that a Scottish clan's battle-cry would activate it, but she couldn't remember which one. She whispered the war-cries of both Ross and Robertson before trying Munro, but even then, she said it in English instead of Gaelic, and nothing happened. Dropping back to the pillow with a tired sigh, she closed her eyes and started counting sheep-drawn chariots. After several minutes, they came upon a phalanx of Macedonians armed with giant blood-red sleeping pills. Instinctively, she drew them all up into battle formation. It was better than nothing.

The attendant finished his introductions to the audience and motioned to the open doorways on each side of him. At the scattered applause, the house lights dimmed. The sound of September crickets came faintly through the walls.

Wendell trembled slightly with nervousness as he walked to the game machine. He focused his eyes on his seat, ignoring the springy luxuriance of the carpet and the rows of privileged spectators, who had gathered to watch the first tandem game ever played—and, unknown to them, the first to decide an international issue between two governments. He was vaguely aware of Terri sliding into the seat beside him, and felt the familiar vibrations of the machine under his hands. Their opponents would be entering from the opposite door, and also seating themselves. The attendant stood by to await nods from all four Masters. When he had them, he pressed a lever on the screen and retired.

A fifteen-second red warning light went on, and Wendell just had time to glance at Terri with a quick smile. She smiled back while chewing on the inside of her cheeks.

"*Here we go,*" said Richard, in a neutral tone.

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The screen read: "Mount Badon. *Ca.* 490-503 A.D. Briton *Dux Bellorum*, Artorius."

"Mount Badon," Wendell whispered to himself, staring. This hadn't been in his Apprentice training. It was a recent addition to the military annals. "Mount Badon?"

Richard was there as always, but not without hesitation. *"Uh, Mount Badon. It was, um, a battle considered semi-legendary for almost sixteen centuries. Won by a Roman . . . Romano-British leader over waves of invading Saxons . . . yeah, that's right."*

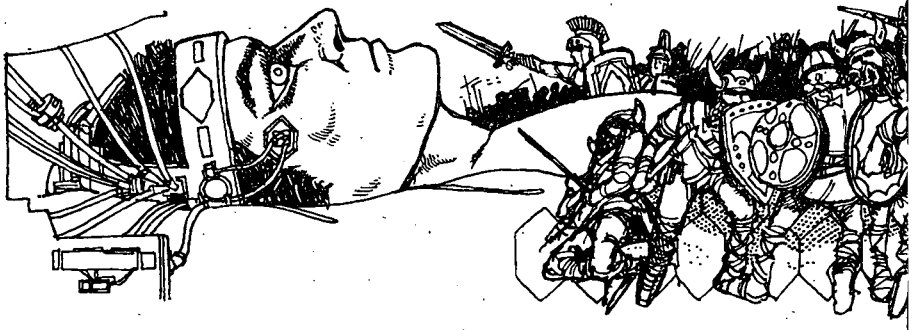
"I need something useful," thought Wendell, with unaccustomed deference.

"The actual site was only discovered six or seven years ago." Richard paused, then continued with more certainty. *"Classic battle. We hold about five thousand infantry, stretched across the upper third of a gentle slope, facing down in three lines. Scouts and skirmishers have gone ahead. Experienced Briton commanders are joined in a confederacy under you, as Artorius. The decisive element is the heavy cavalry which you direct personally, numbering maybe a thousand. The Saxons want this slope to advance northward, divide the Celtic kingdoms, and control the horse-raising country. They must come to us."*

"Hold it," thought Wendell. "Look at the screen—that isn't right. Mount Badon began as a siege, didn't it? The Saxon host surprised Artorius with a small force atop Mount Badon and had him trapped."

"That was earlier," Richard said forcefully. *"This begins after reinforcements have arrived. The Saxons pulled back yesterday to avoid being attacked on two sides. Now they're on the advance again—starting here."*

"All right, sorry," thought Wendell. "Let's see—steeper slopes



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protect our flanks; we'll send the cavalry out from there, of course." He was musing to himself as much as to Richard. Checking the screen for Terri's *persona*, he found her as a Briton commander whose name was unknown, in charge of the irregular infantry confederation below that was modeled on portions of the old Roman legion. In the single games, her role probably would have gone to a computerized personality.

"*Don't worry about your cavalry command. You have a defensive posture here. And remember, this is not the era of the heavy lance, with armored horse. Your mounts are vulnerable, and the weapons will be primarily spear and javelin. Charge in a series of rushes, not a single heavy line.*"

"Right." Wendell fastened his gaze on the screen, feeling a return of the confidence that he had momentarily lost. He recalled when the archival discoveries had been made; it had been a tremendous find, and he had studied it avidly. But the information had never been absorbed as thoroughly as the battle facts he had learned as an eager apprentice.

The screen activated, and Wendell found himself on the right slope with all of the cavalry, still unpositioned.

"We're outnumbered by about three thousand," said Richard. "But the Saxons have no cavalry. The real Mount Badon was a total slaughter of the Saxons; you'll have to do very well to equal that."

"Right." Wendell looked out over the green valley beneath him. Far in the distance, the Saxon horde crawled like a giant, living carpet of blackness. Their van was fast approaching Terri's advance skirmishers, who would slowly fall back to merge with the main force. A thin rain of arrows would be arching sporadically from the woods on each flanking hill; these were also

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from scouts and harriers of the Briton force, sent to annoy the enemy, to put their march off stride, and to return with information. They would not do significant damage.

Terri held the three lines of infantry essentially motionless, making small adjustments. The infantry wings were comprised of light javelins and archers, and she pushed them forward slightly to increase their range. The Saxons were coming uphill, and every additional step they took cost them a little more breath. She began to move the standard-bearers some, building morale. As the Saxons approached, the calls of their sheep-horn trumpets preceded them in Wendell's mind, and the Britons answered with war-cries and old Roman trumpets and by beating on their shields with their weapons. The valley began to fill with the dull roar of massed voices, spiced with the shriek and bellow of the horns.

The Saxons were coming slowly, both to save their breath and to taunt the waiting Britons. Restraint, and a keen sense of timing, would decide the battle at many different junctures. Wendell also waited, trusting Terri not to break ranks early. In the fighting itself, if she could force the Saxon reserves into battle before he was forced to bring in the cavalry, all should be well. She, in turn, was trusting him to throw in the cavalry at the critical moment when she had held as long as possible—and no later.

"*Position the cavalry.*" Richard's voice was firm and cool, perhaps even more authoritative than usual.

Wendell sent a third of the cavalry squads behind the crest of the slope, out of sight of the Saxons. They circled to the wooded area at the left of Terri's infantry and then stood there assembled, still hidden to the enemy. Wendell guarded his trumpeters carefully; only they could signal the left wing now.

Suddenly the Saxon advance lunged forward at a run. Spears and throwing axes would come seconds before the two front lines clashed bodily. As the yards between them quickly shrank, Terri surged forward with the front line of the Britons. The impact of striking shields sent a shock up and down the line. At first, the advantages of gravity and fresh breath carried Terri's line hard against the Saxons and pushed them back. As the Saxon line steadied, Wendell kept an anxious eye on the second line. Again, she would feel great temptation to throw them forward, but it was too early.

Slowly, the thrust of Saxon numbers began to push the line of combat up the hill. Behind them, the Saxon reserves followed

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restlessly, allowing their colleagues space to move, but little else. They gained the ground slowly, and Wendell judged that the cost was just slightly greater for the enemy. That would do for the moment.

The first line of Britons gradually backed into the second. The two merged and held. With renewed spirit, the new combined line even carried forward again and down the slope for a short time.

There was one more line to the rear of that.

Wendell studied the lay of the land again, finding the best paths for his three cavalry charges—to each flank of the enemy, and to its rear. When the Brittany Annal had first surfaced, deep in some Frankish stone cellar, it had proved to be an eleventh-century copy of a Celtic monk's personal journal. He had originally written in the mid-sixth century, when the memory of Mount Badon was alive but a generation old. Afraid that the glory of Artorius's victory would be forgotten, he had described the location and mechanics of the entire confrontation in great detail. Its reliability was accepted slowly, but its authenticity was verified by chemical analysis, and the content meshed completely both with known facts and learned conjecture. What the copy was doing in Brittany remained a mystery. The battle itself, almost identical to Cannae, was even closer to a pure theoretical example of that technique because of the Saxon need to advance up the slope for strategic objectives and because of their lack of cavalry. Wendell picked out his routes carefully, and felt Richard nod agreement.

The line of struggle began to recede up the slope once again. Wendell shifted in his seat and took a deep breath. The time for cavalry was coming, and Terri's positioning and execution so far had been nearly perfect. Quickly, Wendell cast about for any surprises, any twists that their opponents might have in readiness, but he could think of none. Their chances of winning lay not so much in besting Artorius and the Britons as in besting their actual Saxon predecessors.

"*That won't be hard,*" said Richard. "*If they save almost anyone, they'll have done better.*"

Wendell watched the struggle stretched across the slope with rising tension. Slowly, grudgingly, fiercely, Terri's line fell back and back. They held good formation, and the final line of reserves stiffened in readiness. All at once, Terri brought the front line back sharply, in an ordered retreat, and they melted into the rear line. As the Saxons continued forward, the one solid line of

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Britons fell hard down upon them again, and Wendell nodded in admiration. Victory was procured by compiling small moves, like this emphasizing the advantage of the slope. The Saxon line faltered and was forced back one more time.

"Here they come," thought Wendell, with a smile of anticipation. The Britons were pressing forward more quickly than before, with both psychological and gravitational momentum. The Saxon reserves could not back away, for fear of losing morale. So, as the line of combat came back down the slope into them, Terri was effectively forcing them into play before they wanted to go. "That's the way."

The Saxon reserves, greatly outnumbering the final line of Britons that was already in the struggle, were ordered forward. Once fully committed, they would have trouble turning to meet the charges of the cavalry. Grudgingly, the massive rear lines of the enemy came forward.

"*Not yet,*" said Richard, sternly.

Intensely anxious, Wendell gave the signal. Trumpets sounded, and a third of the cavalry squads began to move on each flank of the battle.

"*No!*" yelled Richard. "*Too soon, stop it. Hold.*"

"Too late," Wendell tossed back, without regret. Artorius began to take the final third of cavalry around the right flank, high on the shoulder of Mount Badon itself, at a fast trot. Their target was the Saxon rear, for the final blow.

Meanwhile, the heavy cavalry came charging down past the flanks of their own Briton line and took the Saxons hard on each side. The sheer weight and momentum of the charges carried them deep into what was becoming a blunt, curved mass of Saxons, with both flanks turned to form a horse-shoe shape.

"*Look, will you? Stop,*" Richard hissed. "*Can't you see?*" Wendell stared. He had not allowed the Saxon reserves enough time to engage Terri's force. Although they had taken tremendous losses from the initial attack, they were wheeling about to maintain their curved lines, forming the horse-shoe with its open end facing back toward their own south. Instead of smashing the Saxon center and pinching out the strength that pushed against the Briton shield wall, the two cavalry wings had simply re-aligned the struggle. The Saxon center still advanced in good order against Terri's line, and threatened to punch through.

"*Attack. Straight down the slope,*" Richard ordered. "*Go.*"

Wendell hesitated, then continued to push his squads farther on

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his own chosen path. "Their rear is still vulnerable. We'll hurry and—"

"*No time, fool. Charge now, before anything changes. Hit the center. Fast.*" Richard's voice ended in a falsetto note. "*Go.*"

Terri's line had no more reserves. The Saxon center pushed onward, forcing the Britons slowly toward the crest of the slope. If the Saxons attained the crest, all the mechanics of the battle would alter drastically, to their benefit. Wendell rushed his cavalry squads into a canter toward the far downward slope of Mount Badon.

"*No!*" Richard yelled again.

Wendell lurched forward suddenly in the seat with a wave of nausea. He momentarily lost his bearings and his grip on the keyboard. Badly shaken, he looked up at the screen, fighting panic. The keyboard was slick with sweat under his fingers.

"*GARG'N UAIR DHUISGEAR,*" screamed Richard. As Wendell stared at the screen and pounded the keyboard, the cavalry broke from the path across Mount Badon and charged at full gallop for the enemy's flank.

The alert cavalry squads already on the field saw them coming and expertly parted to let them pass.

Wendell stared wide-eyed at the screen, clutching and punching at the keys. The units ignored him. In his mixture of panic and reflex, he couldn't tell if the keyboard wasn't functioning right or if his own hands were out of control.

"*Garg'n uair dhuisgear,*" echoed again and again in Wendell's mind. The cavalry reserves thundered through the opened ranks of their comrades and crashed through to the heart of the Saxons. The tremendous power of the charge crushed the enemy center, and the other cavalry squads renewed their rushes on both sides of the collapsing Saxon horse-shoe.

Wendell looked back at Terri's line. They were holding fast, relieved of the intense pressure of greater numbers. Stability was needed now, and simple attrition. Confidence would sustain them.

Two squads of cavalry split off from the right flank, and swung wide around the struggling mass. They wheeled at the base of Mount Badon, and charged into the enemy rear. The Saxons were surrounded, jammed together, and partially divided into separate bands.

The outcome was decided.

"Victory Conditions, Britain," appeared on the screen. Wendell collapsed back in his seat, ignoring the statistics that were listed

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under the crucial phrase. He was soaked in sweat and sick to his stomach. Breathing heavily, he let his head roll to one side to see Terri. She was damp and flushed. As he watched, she brushed matted curls of hair from her eyes and smiled at him weakly. The attendants arrived, to help them into the back rooms. Wendell waved his away, gesturing a need to catch his breath.

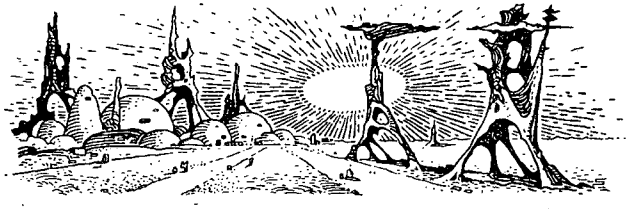
"Made it," he thought. "Congratulations."

No answer. Wendell was too exhausted to wonder about it. He watched Terri leave the room on the arm of one attendant, while several more tried to keep back the crowd of excited spectators. The only voice in his mind was his own.

"Well," he thought, as his strength gradually gathered. "Gone, huh?" There was no doubt that Richard had won this game—the prodigy still reigned. "Wherever you are, congratulations, anyhow."

Far below the city, in a cavern edged with blue-white frost, the gangling body lay unmoving. The tank sparkled in the pale light. Deep within the silent cranium, a spark began to glow.

Wendell lay back in the seat, motionless, looking at the frozen screen without seeing it. He had tread too long on the subtle interface where dreams and dreams threatened to merge. His eyes suddenly focused on the screen, and he thought again of the phosphorous shine and its ethereal universe. Those lives belonged to the dead, but they had thrown a millennial shadow.



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Dear Mr. Scithers,

I bought my first copy of *IA'sfm* over a year ago because I was bewitched by the Good Doctor's handsome countenance on the cover. Quickly I discovered that your magazine's beauty was more than skin (or cover) deep, and became addicted. I also bought that first copy because it was the first issue of any SF magazine that I had ever seen on a newsstand in my home town. (I have, since then, located some others.) However, yours is the only magazine that is widely distributed in this area, and I notice that it is always selling well. In fact, it was a recent traumatic encounter with an empty newsstand rack that finally forced me to break down and subscribe. I believe that you are attracting some new readers around here to SF, and that's very encouraging for me. I get lonely.

The thing I admire most about *IA'sfm* besides–

1. that noble visage on each issue's cover,
2. the excellent editing–congratulations on your Hugo award–(I've especially enjoyed Barry Longyear's stories of the planet Momus),
3. The artwork (I loved George Barr's Nov.-Dec. cover),
4. The features on your cover artists, and
5. your courage in continuously printing those unspeakable puns (I love them, too)

–is your accessibility: I can't think of a better word. You have encouraged and advised so many new writers. You have developed, with your editorials and letter responses, a close and warm relationship with your readers. This makes reading *IA'sfm* a very special experience for me, and I'm pleased that it's now monthly. Don't ever lose that personal touch.

Though I'm no writer, I'm quite curious about just what your story needs are, so I'm enclosing a stamped envelope. Also, what is your advice to a hopeful-and inexperienced-artist?

My only criticism is rather silly; it's that clumsy acronym, *IA'sfm*. My pen has a great deal of difficulty mastering it (surely it couldn't be my *brain*'s fault). Don't worry too much about it. I'd read *IA'sfm* if it were *QWERT$_U$IOP#12?3"½!JKL'sfm*. But I probably wouldn't have written this letter.

Thank you for many hours of fun.

Sincerely,
Jodie Thomas
Bloomsburg, PA

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P.S. Re your February Letters column: *this* young lady doesn't mind if the Good Doctor is "graying" or not! She also requests that he live forever, if he can fit it into his schedule.

Actually, Janet (my wife) says she will kill me if I even think of dying.

Isaac Asimov

Dear Sirs:

Having entered the coterie of sci-fi [SF, dammit: SF. "Sci-fi" is grade-B movie stuff. GHS.] lovers rather recently, I find that sitting here at my desk with nothing to do has ignited a fire in my soul that can only be quenched by penning this missive to your illustrious magazine.

Basically, I would like to find out more about the various conventions that seem to be going on all around us. I am contemplating taking the plunge this year and attending, but I find myself apprehensive regarding the niceties involved. Hopefully, there are others out there in the same predicament and perhaps a column can be initiated to inform us of the goings-on and how one should comport himself at such a gathering.

As for your magazine, I have found it the answer to a dream. I have thought myself to be something of a writer and seeing all the first-sales among your pages has driven me to take the first steps to actually see my name in print. Thank you for your expeditious arrival.

In closing, let me say that Barry Longyear's Momus stories have become a favorite with me and I find myself looking for these incredible tales the minute my copy arrives.

Thank you.

Yours truly,

Pedro Rodriguez, Jr.
Flushing NY

No niceties. You pay your registration fee and plunge in. You will be as welcome as sunshine in winter.

–Isaac Asimov

Dear Sirs,

Although you may be tired of hearing it, I must say (as so many

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others have) that your magazine is *great.* There's just one snag: each issue ends much too quickly!

Some of my favorite stories have been: Conway Conley's "On the Way" (Jul-Aug '78), "In the Country of the Blind. . ." by Melisa Michaels, Ted Reynolds's "Ker-Plop" (Jan '79), and "A Bait of Dreams" by Jo Clayton (Feb '79). The Medea stories are fascinating; I hope more are on the way. And *please* don't let Barry Longyear stop writing his stories about Lord Allenby and Momus the circus planet! They're absolutely my favorite tales.

Everything from "On Books" to "Letters" is interesting and a pleasure to read. I only hope the quality of the magazine continues to be as consistent as it has been through my last five issues. (Which reminds me: is there any possible way of acquiring back issues of IA'sfm?)

I seriously hope something is being done about getting mailing covers again. I have two neat copies of "the magazine" standing next to three others which look as if they've been through a blender. I really hate to see the beautiful cover paintings mangled so. Also, the address labels are havoc to remove from their inevitable spot, right over the titles. (Couldn't the labels be attached to the back cover?)

Well, thanks for your time and patience.

Sincerely yours,
Lauren Buckley (Ms.)
Sophmore, UCLA

We are not tired of hearing it. We never will be.
Isaac Asimov

Dear Mr. Scithers,

This is the first time I have ever written to the editor of any of the magazines to which I have subscribed over the years. The excellent quality of *Isaac Asimov's Science Fiction Magazine* has impressed me greatly and I wanted to let you know that I anxiously await every issue. So far, I have never been disappointed.

I do have a small bone to pick with you. I felt somewhat cheated by missing Mr. Longyear's second episode of Lord Allenby's initial adventure on Momus which you so diabolically hid in the first issue of *Isaac Asimov's SF Adventure Magazine,* which you now so cruelly state is sold out and forever inaccessible to poor simpletons like myself who didn't notice that an "Adventure" magazine could also

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contain excellent quality stories. I have enjoyed the further adventures of Lord Allenby and I sincerely hope that Mr. Longyear continues to grace the pages of your magazines with more stories of Momus.

I have been contemplating for a long time writing a short story or two. I have hesitated doing so because I could never quite believe that anything that I might write would ever see print. I am greatly amazed and encouraged by your open solicitations of new writers' manuscripts and the resulting excellent quality of stories appearing in your magazine. I would greatly appreciate your sending me your description of story needs and manuscript format in the enclosed self addressed and stamped envelope. [*Done!*] Meanwhile, I will brush up on my negligible typing and proofreading skills in anticipation of hopefully producing a manuscript for your consideration.

I am delighted that *IA'sfm* will now arrive monthly filled with the both the serious and not so serious science fiction (and fact) which has endeared your magazine to my heart. I trust that you and the good doctor (PhD) will continue to publish the finest magazine that I have ever enjoyed.

Sincerely,
Paul Jan Thomas, MD
LTC, MC
Washington DC

Come, come, we assume that anyone reading one of our sterling magazines will also read the other.

–Isaac Asimov

All is not lost: the second Momus story, "The Magician's Apprentice," appeared in the second *issue of* Adventure, *which is still available at a cost of $2.00 from our special order department at 380 Lexington Ave., New York, NY 10017. Meanwhile, Mr. Longyear has just completed a prequel–that is, a story that takes place before, rather than afterwards, as a sequel–which tells how the circus originally took off from Earth. It will appear in the fourth issue of* Asimov's SF Adventure Magazine.

–George H. Scithers

Dear Dr. Asimov:

As I write, I am contemplating yet another issue (February 1979, to be exact) with a mailing label plastered across the front cover.

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The two issues with wrappers were nice, and hopefully, by the time this letter is printed, some alternative solution will have been devised. Perhaps you could make a deal with the Science Fiction Book Club and put the labels on the *back* cover.

The issue itself was excellent, however. I did not like either "Proud Rider" or "A Bait of Dreams," but I can't define why. Perhaps it has something to do with the fact that a short story can always be tolerated, whatever the quality, but a longer story can be excruciatingly painful by the time one reaches the end. Neither story was particularly terrible, but both were very tiring.

The shorter stories were not simply tolerated, though–they were immensely enjoyed! "Back to Byzantium" is one of the best after-the-bomb stories that I have read, and is in a class with "A Canticle for Leibowitz." "On the Benefits of Programming" was especially enjoyable for me, as I am something of a computer expert and have noticed the implications of a world information net. What I especially like are the short-shorts of only a page or two–these are of uniformly high, usually humorous quality. Other science fiction magazines that I read usually take themselves too seriously–every story has to have some deep meaning, which is often stretched out over thirty or fifty pages. You seem to have realized that enjoyment is really the primary purpose for the existence of any story.

The best part of the issue, however (apart from the tantalizing editorial), was the article "On Kepler, Newton, and Company." I spent three months in high school physics last year on orbital mechanics, and did not learn as much as George O. Smith presented in a few minutes. If only all classes could be as well taught! I just hope that such science articles will be more frequent in future issues. Naturally, you cannot write them yourself, as you would be competing with your own F&SF articles, but there are some other good authors out there.

In closing, I would like to cast my vote with that of Dean Lambe (Letters, February) . . . *IA'sfm* is really far too much strain on the shift mechanism of my poor typewriter. Let's make it *IASFM* (or better yet, *IAMSF!*)

Sincerely,

Stephen Fleming
3532 Paces Place NW
Atlanta GA 30327

Please note that Smith's article meets with much approval here–and yet much disapproval elsewhere. As long as unanimity is impossible,

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we have to play our own judgement. If, on the whole, it matches the majority, we've got it made.

–Isaac Asimov

Dear Sirs:

I have just read my fifth issue of your magazine and I must say I find it as delightful as the other four I have read.

If I may, I have but one comment on the February issue: Why did you waste twenty-five precious pages on "On Kepler, Newton, and Company"? I plowed through two and a half pages and didn't understand one word. As for the other twenty-two and a half pages . . . well, the drawings were nice. The article may have had a point, but why *TWENTY-FIVE* pages??? It was a horrible waste and I hope you think twice before doing it again (please!).

Enclosed is a self-addressed stamped envelope. Would you please send me directions for submitting stories to your magazine? [*Yes!*] Thank you.

Sincerely,
Lanette Neal

That particular article will wear well. It is the best summary of an important period in science history I have ever read. Consequently, some time in the future, tackle it again. You may be surprised to find out how much it's improved.

–Isaac Asimov

Dear Sirs:

I do not ordinarily write to editors unless I've been grievously offended. Mr. Scithers' questions at the end of the letter section in the February issue have prompted me to make an exception.

I got to wondering why I *do* scan the magazine racks, eagerly looking for the next issue of *IA'sfm*. I think it is because your magazine is so different from what I was accustomed to reading.

For several years I gave up on science fiction magazines, and got my reading from the library. It seemed to me the magazines were just filled with the same old writers, expressing the same old ideas. The editorial matter was either everyone telling each other how great they are, or protracted arguments about trivial and esoteric points. Editors seemed obsessed with expressing their particular views on writing and The Truth of the Universe.

When I first saw *IA'sfm*, I instinctively avoided buying it. It was one of the first issues, with Asimov's name and picture plastered

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prominently on the cover, and I figured it would be just more self-congratulation.

I think what first got me to notice the magazine was, of all things, seeing *Adventure* on the shelf in the supermarket. I was amazed. It looked as if the magazine actually might be *fun* to read. Hope was born again, that I might have found some editors who'd not forgotten that the genre is called science *fiction*.

I'm not advocating slipshod science. I've just read too many stories where the author got so involved with his science that it ceased to be a story; rather, it became a Physics 200 lecture. Just as a good story can't carry bad science, good science can't save a bad story.

Anyway, I'd just gotten paid, and I figured as long as I was going to grab *Adventure,* I'd try the September-October issue as well.

I was quite pleased with it. There were a lot of stories, a lot of short pieces, a lot of items by new writers (I found *that* especially encouraging), and more importantly, a lot of new ideas.

Then I came across "Bat Durston, Space Marshal," and was sent rolling, giggling hysterically, across the floor. Good Lord! A magazine with a sense of humor!

The November-Dekember issue almost turned me off again. I have an inherent distrust of magazines that put pictures of gorgeous, semi-nude women in the tentacles of alien monstrosities on the cover. But somehow I made it past the cover, and again was delighted with the magazine. Now I'm hooked.

A note about circulation: It seems adequate in our area. I missed the January '79 issue, but that may be just because I didn't get down to the supermarket fast enough.

I am, however, distressed that I haven't seen an issue of *Adventure* since the first one. From your letters column, I take it the thing hasn't died, so either it isn't making it here to the frozen northland, or I've just missed it. (A very real possibility.)

Keep putting out the good work,

Bruce Bethke
River Falls WI

MORE self-congratulation? What can you mean, sir? When have I ever self-congratulated–undeservingly, that is?

–Isaak Asimov

Dear Mr. Scithers,

Since the arrival of my first issue of your magazine (Jan.-Feb. '78)

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I have looked forward eagerly to each new issue. Now that I have eight of them under my belt, I thought I should send along a few comments and suggestions. And a big "Thanks!" for a job well done.

HOW I BECAME A SUBSCRIBER: Sometime in 1977, the local junior high school had a magazine drive. Since one of my sons was in the seventh grade, I felt it was only my bounden duty to subscribe to something. (Who can resist the appeal of a seventh grader, especially when he is holding a buck-knife to your ribs?) In looking over the list of magazines, I spotted *IA'sfm* nestled between *Argosy* and *Disco Ditties*. I had never heard of it; in fact, I didn't know there WERE any more SF magazines extant. The choice was clear.

Incidentally, I have never seen your magazine on any of our newsstands in this town of about 70,000 people. We have had, however, two SF Cons in recent years, so there must be some issues floating around Sonoma County someplace.

WHAT I LIKE: Letters, Editorial, Puns, Books, Stories, Art–in fact, everything. Especially appreciated ar the Lovecraftian [*Lovecrafty? GHS*] ads in "Support Your Local SF Bookstore." As for the stories, I love some and hate others–but the important thing is to have variety and good writing. And my poison is doubtless someone else's meat–*chacun à son goût*. You are to be congratulated for your encouragement of new, young authors, and for a sure and skillful job of editing.

WHAT I DON'T LIKE: The format of "On Books" bothers me . . . I find it hard to refer back to this important feature and find titles that interested me on first reading. Laziness, I suppose; perhaps putting the titles in boldface instead of italics would help. Also, how about some biographical material on Mr. Brown, Mr. Olsen (whose "On Records" column in the Feb. '79 issue was an unexpected delight), Mr. Gardner and Mr. Strauss?

Thank you again, and please send me your instructions for submitting mss. A 9½ inch envelope (of sorts) is enclosed. [*Done!*]

Nancy Harrison
1150 Wild Rose Drive
Santa Rosa CA 95401

P.S. My regards to the Good Doctor. Please don't overwork him, Mr. Scithers–we need him!

Bless you for the P.S. And it's not just George; everyone *overworks me. Especially including me.*

–Isaac Asimov

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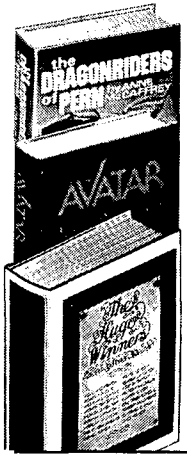

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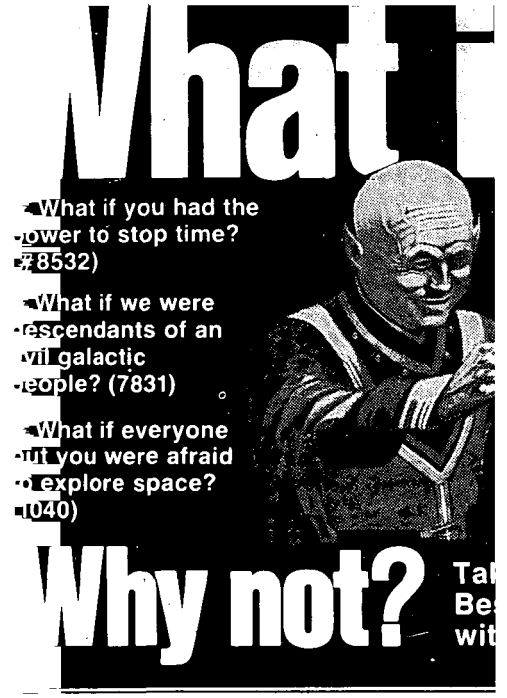
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